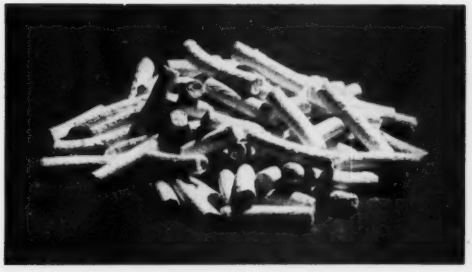
35th Year JULY, 1951

RUBBER AGE

DAY BY DAY...

RODFORM ACCELERATORS

are improving in every way



LESS DUSTY · MORE UNIFORM · BETTER DISPERSING

R. T. VANDERBILT CO. INC.

230 Park Avenue, New York 17, N. Y.

Manufacturers find DU PONT THIONEX-MBTS *ACCELERATION* is best for "cold rubber" treads and camelback

Here are the advantages tire and camelback manufacturers found in tests comparing Thionex-MBTS combinations with their regular-production accelerator. They proved to themselves Thionex-MBTS acceleration is unexcelled in "cold rubber" stocks containing fine furnace blacks.

TREAD WEAR—Tests proved that the treads of tires containing Thionex-MBTS combinations wore fully as well as the treads of the control tires.

TREAD CRACKING—Treads accelerated with Thionex-MBTS showed no evidence of crack growth during test runs of as long as 43,000 miles.

PROCESSING SAFETY—Actual factory experience showed that stocks accelerated with Thionex-MBTS were very safe processing. Mooney scorch times of 30 minutes are typical of "cold rubber" treads and camelback compounds containing Thionex-MBTS acceleration.

STORAGE STABILITY—Camelback manufacturers appreciate the storage stability of stocks containing Thionex-MBTS. Unlike compounds containing some types of accelerators, stocks using Thionex-MBTS acceleration do not lose curing strength nor do they "set-up" after prolonged storage.

COST—The use of Thionex-MBTS acceleration saved money . . . was 40-50% lower in cost than their regular-production accelerators.

● **For complete information on Thionex-MBTS Acceleration, see Report BL 235. Extra copies are available from your District Office.**

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Another new development using

B. F. Goodrich Chemical Company ***raw materials***

cutting block that cuts costs, too!

"Cut Rite Bloc" made by Rubber Engineering and Chemical Co., Lake Zurich, Ill.

HERE'S another success story that may help you—that shows how Hycar rubber improves products while it cuts costs.

The picture here shows a laminated cutting block made with a Hycar rubber compound. And what a difference it makes, compared to ordinary blocks. With formerly-used blocks, leather, rubber, cloth and other materials are frequently soiled by sawdust or discoloration.

This problem—and others—went by the boards when the Hycar-made block was developed. Cutting noise is greatly reduced. Dies remain sharp longer. There's uniform cutting efficiency in any weather. The block is good for millions of cuts. The wear-down in normal service is approximately ¼" per year.

It's another score in the long list of Hycar-helped successes. For Hycar is so versatile that it resists heat and cold, water, weather and wear, gas, oil, chemicals and more damaging conditions.

Hycar may answer your problems—may help you improve or develop a product. Demand now exceeds supply, but limited quantities are available for experimental work. For helpful technical advice and information, please write Dept. HA-4, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

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See Sweet's File for Product Designers, Materials Section, for further data on Hycar

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Philblack* A *is the fellow who'll Keep those tires running cool!*

When it comes to dissipating internal heat in heavy duty truck, bus and aircraft tires, Philblack A rates "A-1."

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You can get equally effective protection in solid or foamed natural rubber with WING-STAY S—Goodyear's use-proved antioxidant that is in wide use in white and light-colored compounds in a range of products.

Although WING-STAY S is presently in short supply, you should investigate its potentialities *now*—and be ready to use it when normal supply returns. You can get full details and sample for your laboratory use and evaluation by writing:

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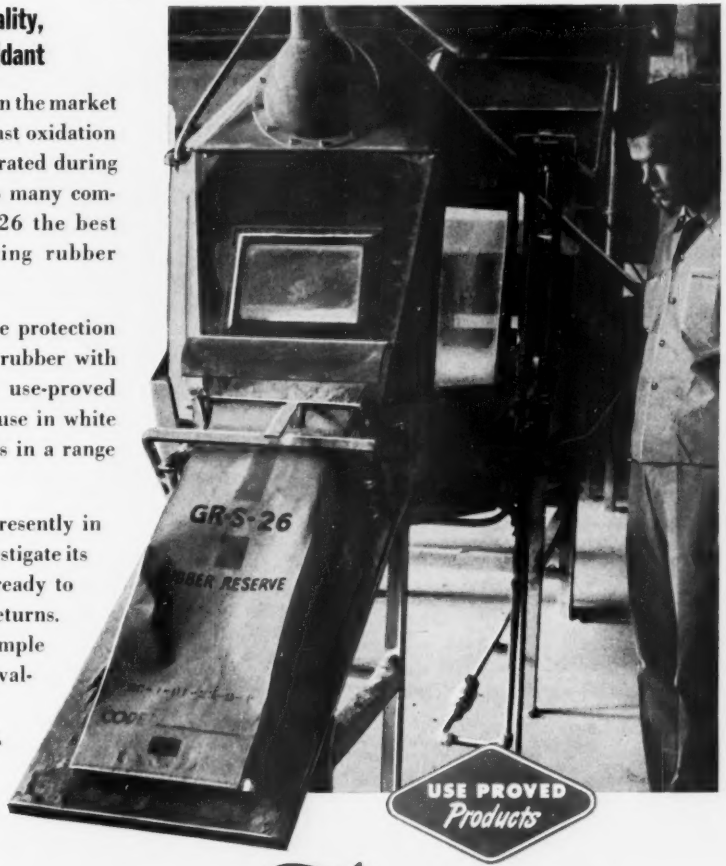

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Ever wonder why the rubber compounding tide is running so strongly to Naugatuck? That's because hundreds of companies are finding there's nothing quite like the product quality or the research and technical help they get from Naugatuck.

A few of the raft of Naugatuck-processed products are pictured here: Tape, rug underlay and backing, stationery, leather folders, shoe parts, woolens, cottons, conveyor belts, gloves, tire cords, rubber toys. *We cover the waterfront on water-based latices.* For new product improvement or compounds, write to address below.

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MULTIFEX MM, one of several grades of Precipitated Calcium Carbonate produced by DIAMOND ALKALI, is recommended for light or dark colored, soft, flexible compounds of natural or synthetic rubber. It has a highly uniform, ultra-fine particle size of .05 to .06 microns.

DIAMOND's Technical Service Staff is available to assist you with any problems of formulating with MULTIFEX MM. For further information or technical assistance, just call your nearest DIAMOND Sales Office.

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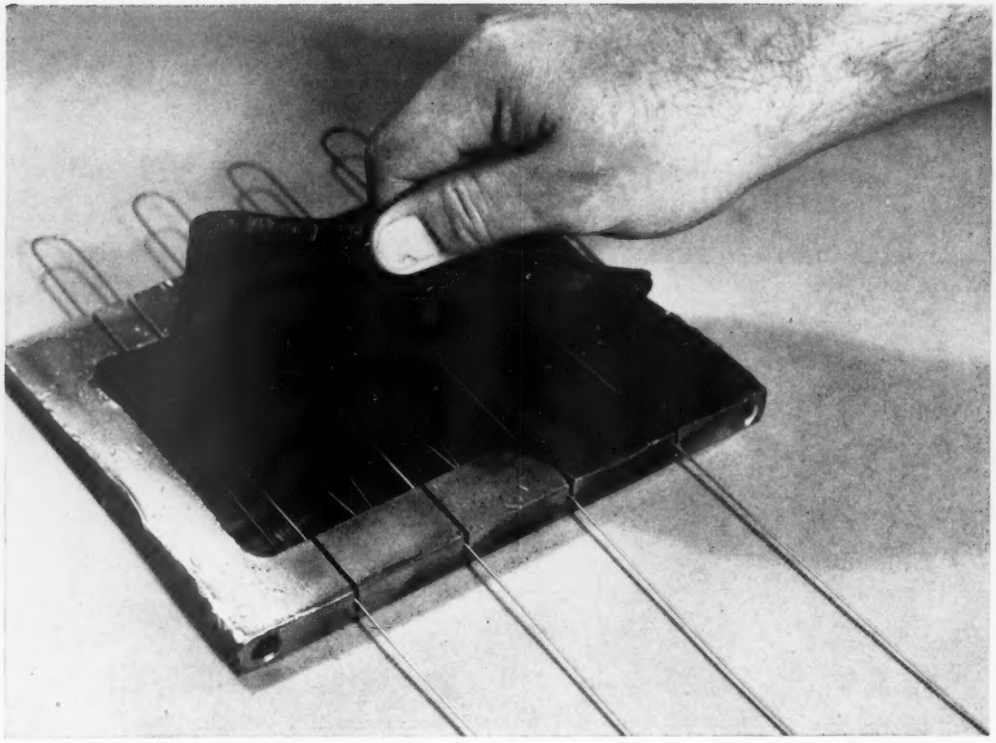

How we use pull . . .

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• It doesn't pay to take things for granted. That's why extensive wire research goes on *all* the time at National-Standard — behind-the-scenes work that time and again helps our customers speed operations, save material, improve their products and cut costs.

The lab test being rigged above, for example, will reveal the rubber adhesion qualities of a newly developed wire finish. After the rubber layers are vulcanized, carefully recorded pull will be exerted on the imbedded wire until it finally breaks loose. Only by such painstaking test work can you be assured of new, improved qualities and characteristics that will let you make the *most* of wire.

Whatever use you make of wire—in rubber products, or anything from bottle caps to zither strings —keep in mind that National-Standard's facilities, experience and "groundwork" are always ready to help you put wire to work with the *greatest* efficiency at the *lowest* cost.

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United channel blacks are remarkable products wrested from hydrocarbon gases in miniature flames that are starved for air.

United channel blacks stem from over four million precisely regimented flame factories where each particle of black is refined in incandescent heat.

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United channel blacks have been in use for decades and have an enviable record of satisfactory performance. They are uniform, dependable, and ever in demand.

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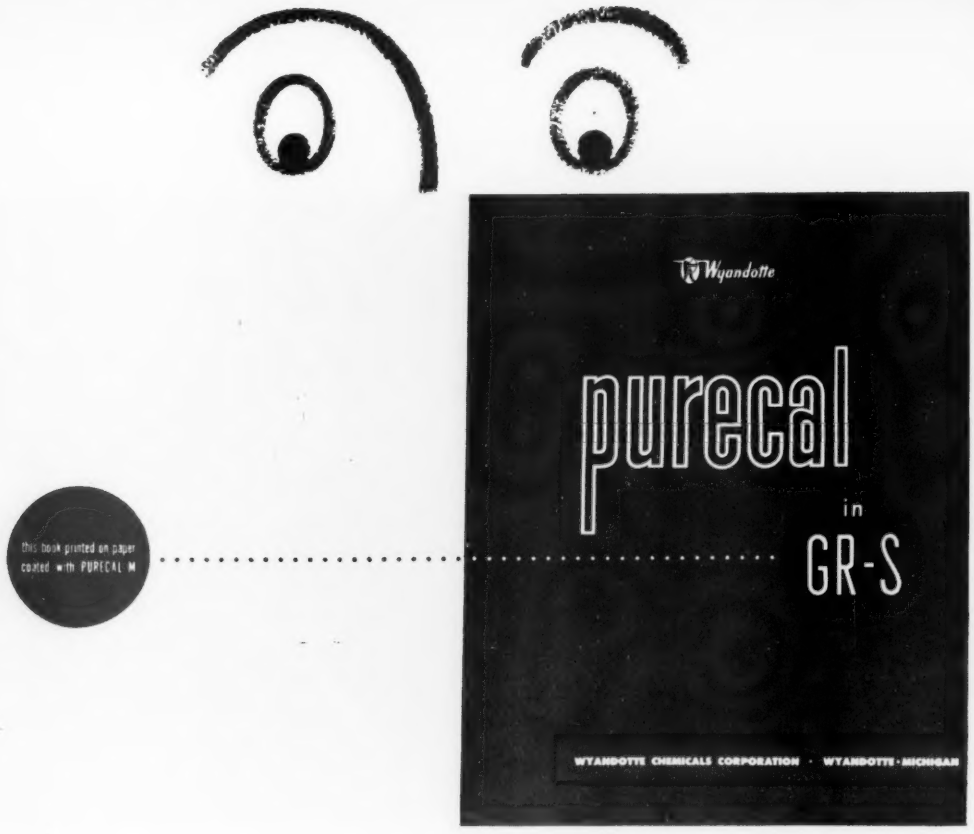

See this new booklet for savings with GR-S

Chances are you've got GR-S on your mind. Well, that's what this new booklet is all about. It's titled "Purecal in GR-S"... it's a complete discussion of Purecal* and other non-black fillers in GR-S, compared with carbon blacks.

It gives you the facts on a new GR-S base compound of carbon black quality that can be made with Purecal. And it tells the story of the advantages of this new compound. This booklet is a working tool that offers basic information on the compounding and processing of Purecals in GR-S and cold rubber.

"Purecal in GR-S" is hot off the press and it wouldn't be a bad idea to write for your copy soon.

* *Trade Mark*

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An easy processing zinc oxide. Uniform particle size and absence of extreme "fines" assures good dispersion in rubber.

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can a rubber chemist learn from a soap chemist?

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Diglycol Laurate	Paper Textiles	Defoamer Emulsifier
Diglycol Stearate	Cosmetics Paper Metals	Emulsifier Plasticizer Lubricant
Poly Glycol 200 Mono Laurate	Plastics	Viscosity Stabilizer
Poly Glycol 400 Mono Laurate	Insecticides General Plastics	Emulsifier Non-ionic wetting agent Anti-static agent
Poly Glycol 400 Mono Stearate	Textiles	Suspending and thickening agent
	Pharmaceuticals	Suspending agent
Poly Glycol 400 Distearate	Shampoos	Thickener and foam stabilizer
Poly Glycol 600 Mono Laurate	Detergents	Non-ionic surfactant
Carbowax 1000 Mono Stearate	Paper Coating	Anti-gelling agent
Carbowax 1500 Mono Stearate	Pharmaceuticals	Dispersing agent
Carbowax 4000 Mono Stearate	Electrical Insulation	Water soluble lubricant
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Yes, a rubber chemist can learn a thing or two from a soap chemist about polyhydric alcohol fatty acid esters. The rubber chemist can learn how Polyethylene Glycol 400 Di Laurate and Mono Laurate affect synthetic rubber and resin latices. The soap chemist knows well how the monoester is an excellent penetrating and cleansing non-ionic wetting agent capable of improving quality and adding good properties to his products.

Note how the products in the above table change in uses as the molecular weight increases. No matter what field you are in, Glyco can tell you a thing or two about polyethylene glycol monoesters. Why not send to Dept. RA for a copy of our latest Ester Catalog today?

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1327-ton hydraulic platen press for the manufacture of molded brake lining and similar products.

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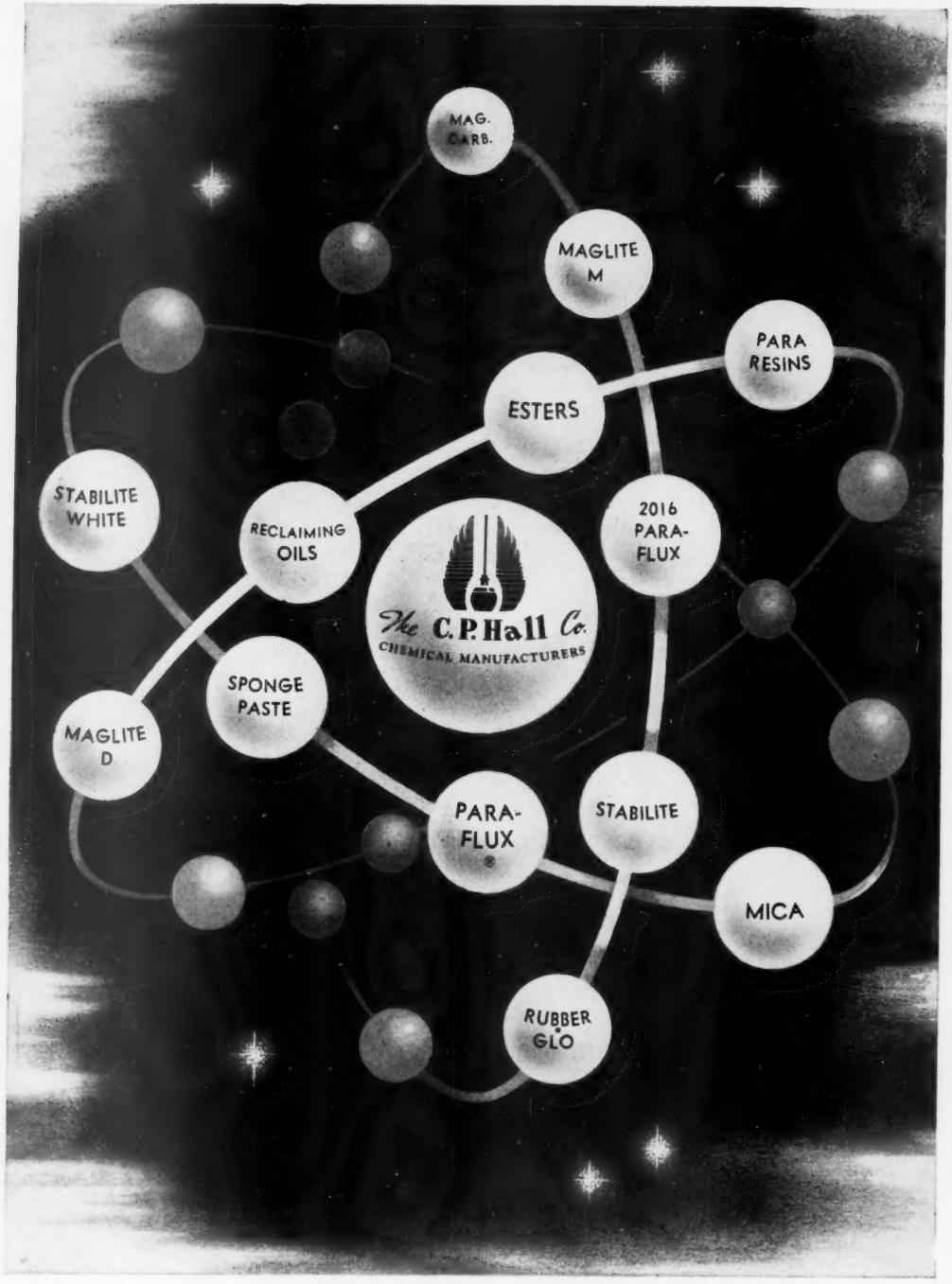

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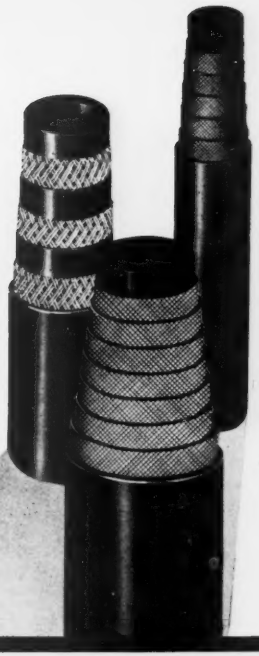
When it's PELLETEX *you KNOW...*

Hose will Out-Service, Out-Last Every other kind



PELLETEX®

PELLETEX protects hose tube, friction and cover, makes them stronger and extends their life. PELLETEX compounds maintain a very low water absorption and high resistance to steam, air, oil, gas, gasoline, chemicals, paint, varnish, solvents, animal and vegetable oils or products.

PELLETEX imparts excellent physical and aging properties, and assures a uniform tubing speed that helps compounds to hold their shape during processing. Hose stocks containing PELLETEX extrude smoothly and rapidly, and permit flow into the fabric during vulcanization.

Finished hose made with PELLETEX is pliable and resilient, yet tough enough to withstand rubbing, dragging, and considerably rough treatment. Manufacturers of best hose always specify PELLETEX.

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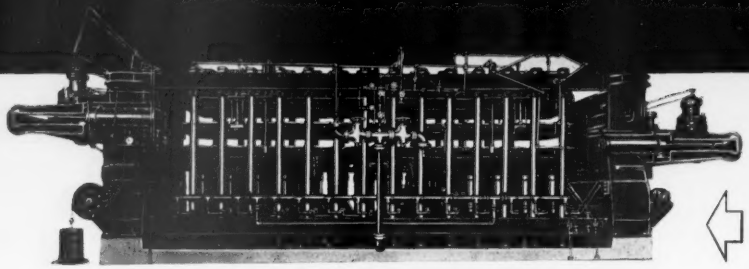
ADAMSON UNITED HYDRAULIC PRESSES

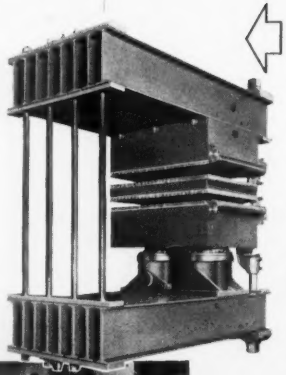


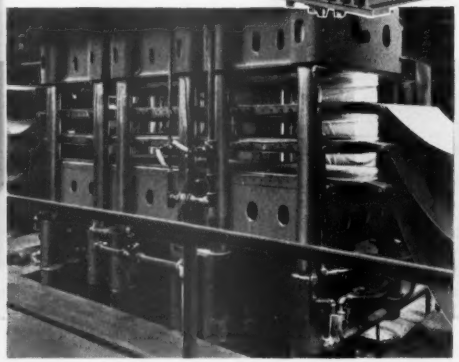
TWO-OPENING

This press has two openings permitting two lengths of belting up to 60 inches in width running in opposite directions, to be cured simultaneously. It is equipped with polished platens 63 inches wide by 31 feet long. Twenty-eight rams provide pressure during the curing operation. Proper belt tension is maintained by

FLOOR COVERING PRESS

A three-opening 42" x 126" Rod-type Press with three 22" hydraulic rams. The head, platens and bolsters are continuous the full length of the press. Just the press for your floor tile and runners. Flooring may be cured in molds, or between flat, sandwich plates. A prime characteristic of this press is its versatility. Addition of stretchers makes it adaptable to belt curing, or, cut apart, it becomes three separate 42" square presses.





OPEN-SIDE BELT PRESS

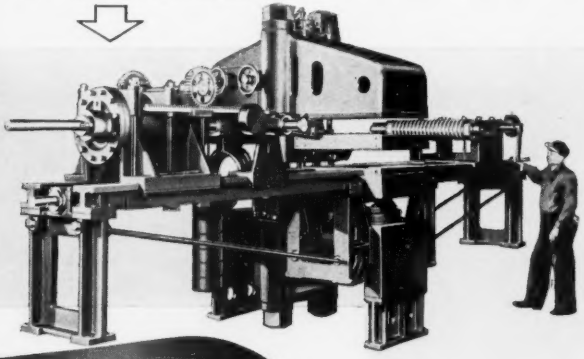
Through the use of structural beams for the head and base, with strain rods, this heavy-duty unit is desirable for the larger, more powerful open-side presses. Cold ends are built into 50" x 42" platens. The intermediate platens are held horizontal by four heavy guides traveling on turned and ground strain rods. The press is powered by two 20" rams. Excellent for curing "V" and flat belts.

One of the most important uses of the Press is the curing of endless belts. Endless belts can be put into and taken out of the Press very easily.

30" x 36" OPEN-SIDE BELT CURING PRESS FOR FLAT OR V-BELTS

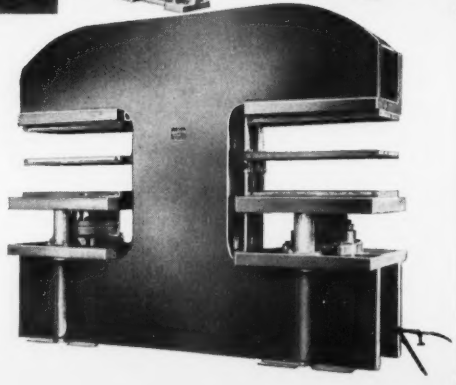
Complete with adjustable hydraulic stretcher, this press was designed and built for one of the industry's largest belt manufacturers. All platens are equipped with built-in cold ends. Intermediate platen with counterweights, is accurately suspended and guided on ground strain rods. Overhead push-back is provided for intermediate platens and bolster. Platens are chromium plated for flat belt curing.

Stretcher rolls are made up of steel cores and shells of aluminum grooved to the proper contour for the belts involved. Aluminum roller shells are interchangeable.



DUPLEX PRESS FOR CURING "V" TRANSMISSION BELTS

The flat belts cured on this type of press are used in all kinds of agricultural machinery and wherever flat pulleys must be driven. It is a rugged, easily accessible, economical press with fabricated steel plate housing. It is equipped with spring-loaded pull-backs for the bolster. Intermediate platen is suspended in a manner that assures operator perfect parallelism of top and bottom platens. This press is indicated where pressures are comparatively low, and is ideal for curing "V" belts, etc. Manually or hydraulically operated belt stretcher equipment is available.



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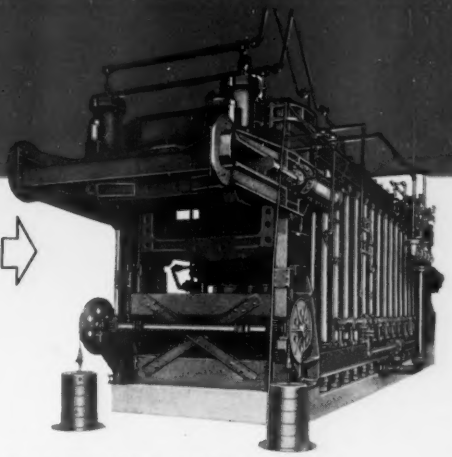
FOR ENDLESS FLAT BELTS AND ENDLESS V-BELTS

Our latest catalog of Hydraulic Presses for the Rubber, Plastics and Plywood industries, is ready for distribution. It describes and illustrates many types of Presses not shown in this advertisement. Send for it. You'll find it interesting.



BELT CURING PRESS

means of a clamp at one end and a stretcher at the other. These are mounted on separate stands rigidly braced by heavy compression members which extend the full length of the press. The clamp holds the belt while the stretcher is hydraulically pushed away from the press to give the belt the required stretch.

An exclusive Adamson United feature is the means of raising and lowering the stretcher clamps to maintain exact alignment of the press platen surface with the adjustment clamp surfaces. This mechanical method, much superior to hydraulic synchronization, causes the clamps and stretchers to move in perfect unison with the platen, eliminating entirely the possibility of the belt bending over the edges of the platen ends during the curing process. Press can be built with one or two openings in any size, for any platen pressure.

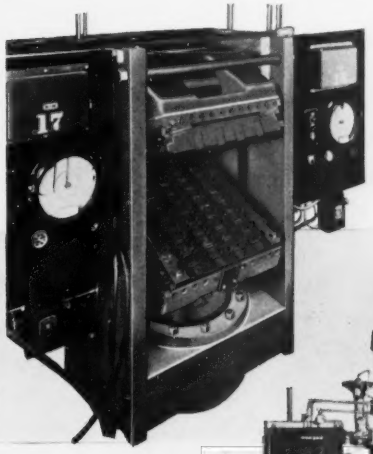
Ram raised . . . molds closed

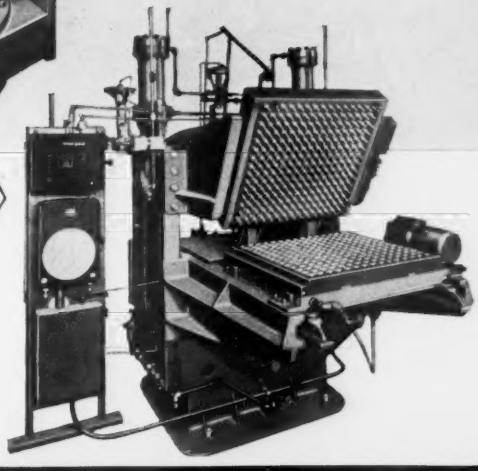
Molds in loading position

ALL HYDRAULIC TILTING-HEAD PRESS

Note the accessibility of this press compared with outmoded conventional types. It is simple and rugged, with 24" x 24" platens fastened to a tilting head and a tilting bolster. The platens remain parallel during the first part of the down stroke of the ram, then tilt open during the remainder of the down stroke. Unlike the Automatic Press, the molds never emerge from the Press. Toggles for opening and closing the molds have been eliminated.

The right amount of pressure per square inch on the platens is maintained hydraulically. Wear or variable platen pressures are eliminated.





SINGLE OPENING AUTOMATIC PRESS

Fully automatic, yet possessing all the advantages of the conventional press for precision molding, this new type automatic, in many instances, has stepped up production as much as 50%.

Operation is extremely simple, with practically all manual effort eliminated. There is no more tugging or handling of heavy molds in and out of the Press. The operator has only to remove the cured articles and replace them with uncured rubber, press a button and the molds recede into the Press and close. A time cycle device opens the Press at the end of the cure and the molds open and move out of the Press and stop in a tilted position, from which the operator can easily strip the cured articles and repeat the process.

Single or double opening Presses can be furnished in this style, to take molds from 32" x 32" to 42" x 42"

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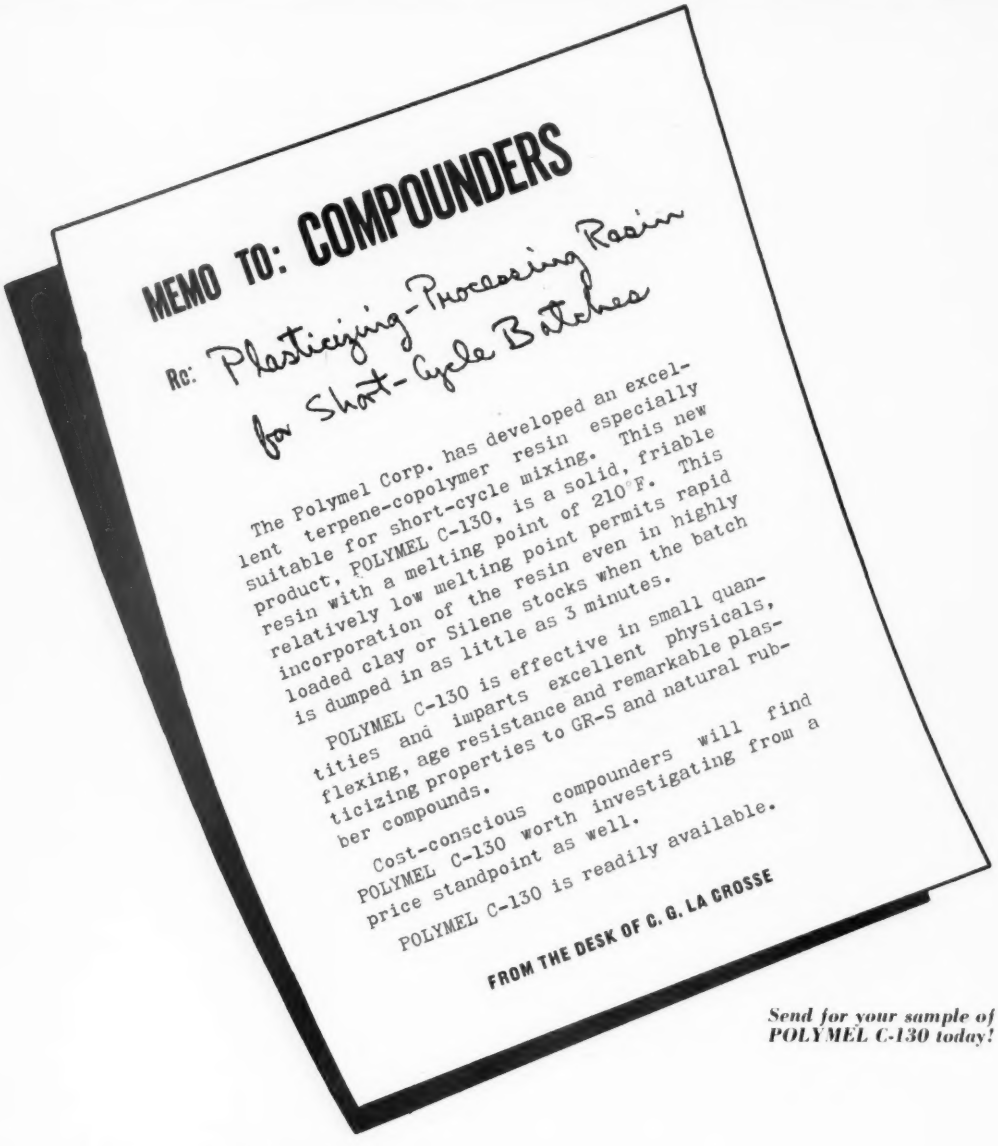
ADAMSON UNITED COMPANY

AKRON, OHIO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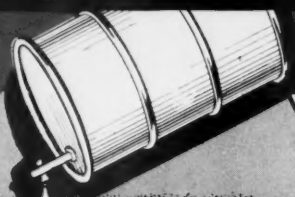

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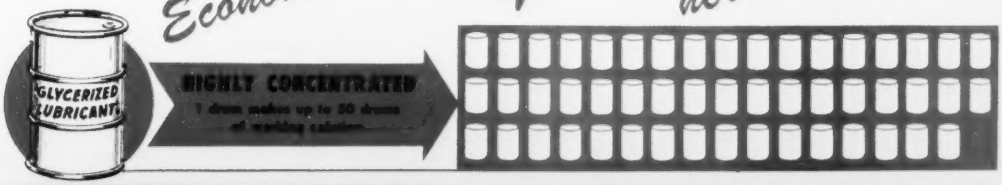

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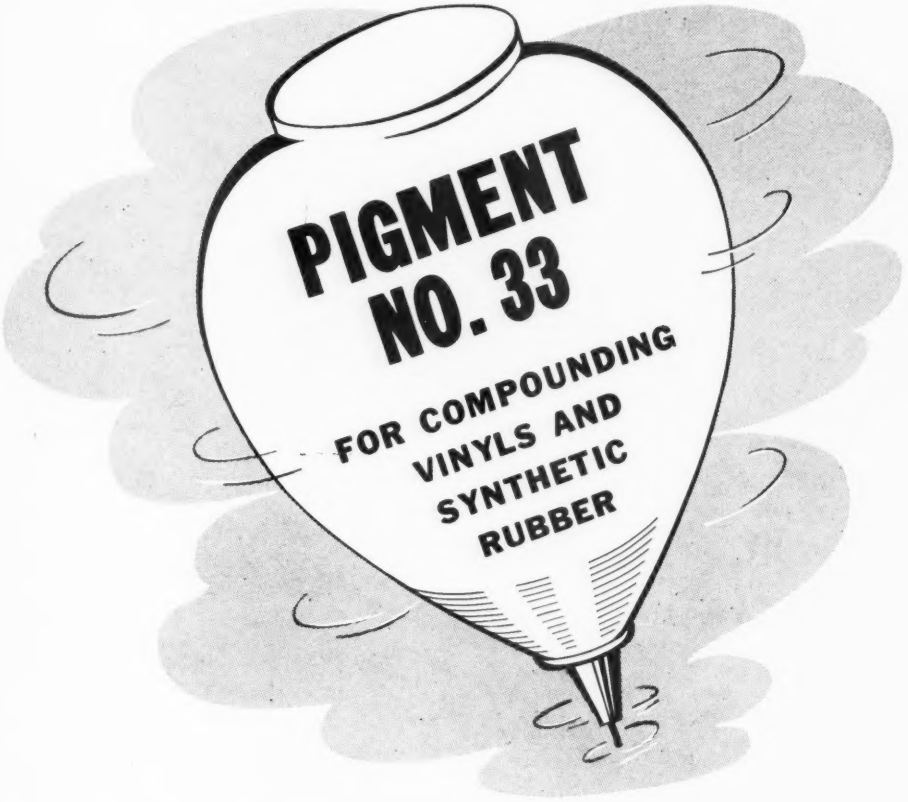

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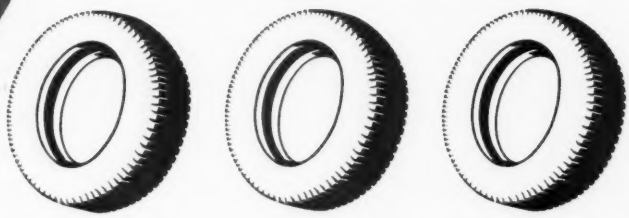


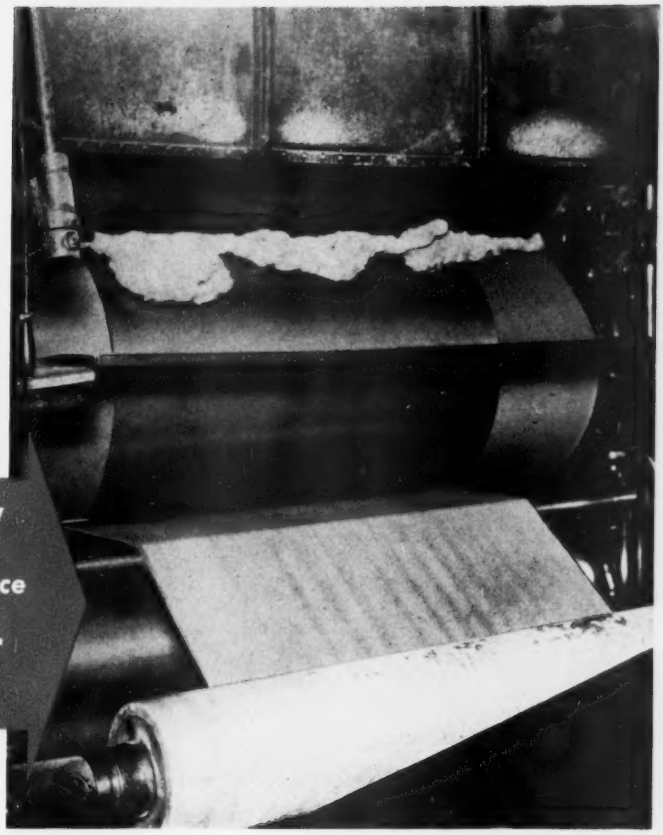
SINCE 1931, the year in which ST. JOE ZINC OXIDES were first produced by our — then as now — unique electrothermic zinc smelting process, these St. Joe pigments have found steadily increasing acceptance by manufacturers of rubber products as primary ingredients in their products.

The various reasons for this acceptance which, incidentally, necessitated a twelve-fold increase in our over-all zinc oxide production, can be summed up in a single sentence: In the course of the past 20 years consumers, by virtue of their experiences with St. Joe pigments-in-use, have come to expect in St. Joe lead-free Zinc Oxides high and undeviating standards of quality and uniformity. Unlike our electrothermic process, the preferential status enjoyed by our pigments in the consuming industries is not at all unique; it merely parallels the history of other well-known products of this company — the largest producer of pig lead and one of the leading producers of slab zinc and zinc oxides in the United States.

For example, St. Joe Chemical Lead, an exclusive product derived from the huge ore bodies of Southeast Missouri, which have been owned and operated by the Company since 1865, is and always has been a standard material in the construction of equipment designed for the production, transportation, storage and use of many of the corrosive acids employed in various manufacturing processes. St. Joe lead-free Zinc Oxides are well on the way towards achieving like recognition in the consuming industries.

ST. JOSEPH LEAD COMPANY
Plant & Laboratory, Monaca (Josephtown) Pa.
250 PARK AVE., NEW YORK 17, N. Y.

Available rubber grade zinc oxides range from extremely fine particle size types imparting highest possible reinforcement, to grades having coarser particles with a minimum of fines for maximum ease of incorporation and dispersion. Our recently published 55-page Technical Data Book describes in detail each **ST. JOE RUBBER GRADE ZINC OXIDE,** and is available — with our compliments — to Purchasing Agents and Technologists.



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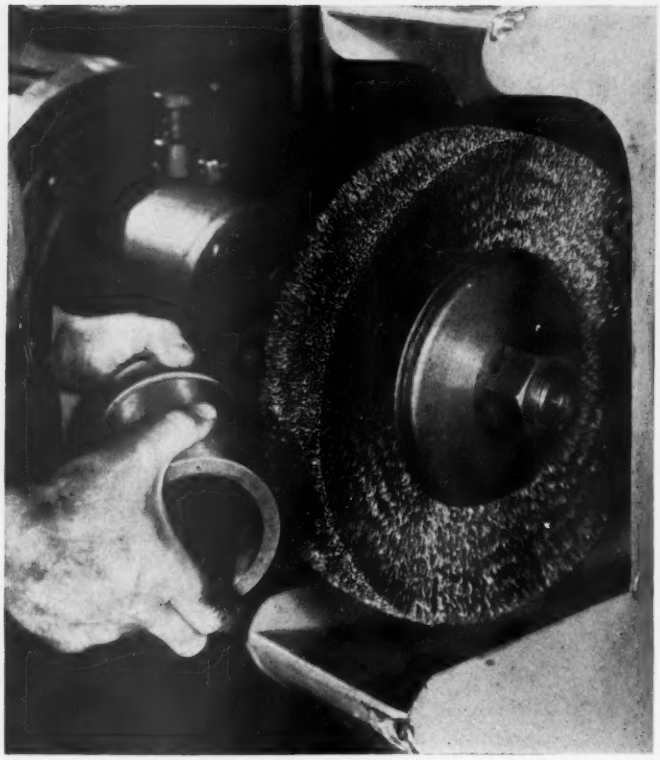

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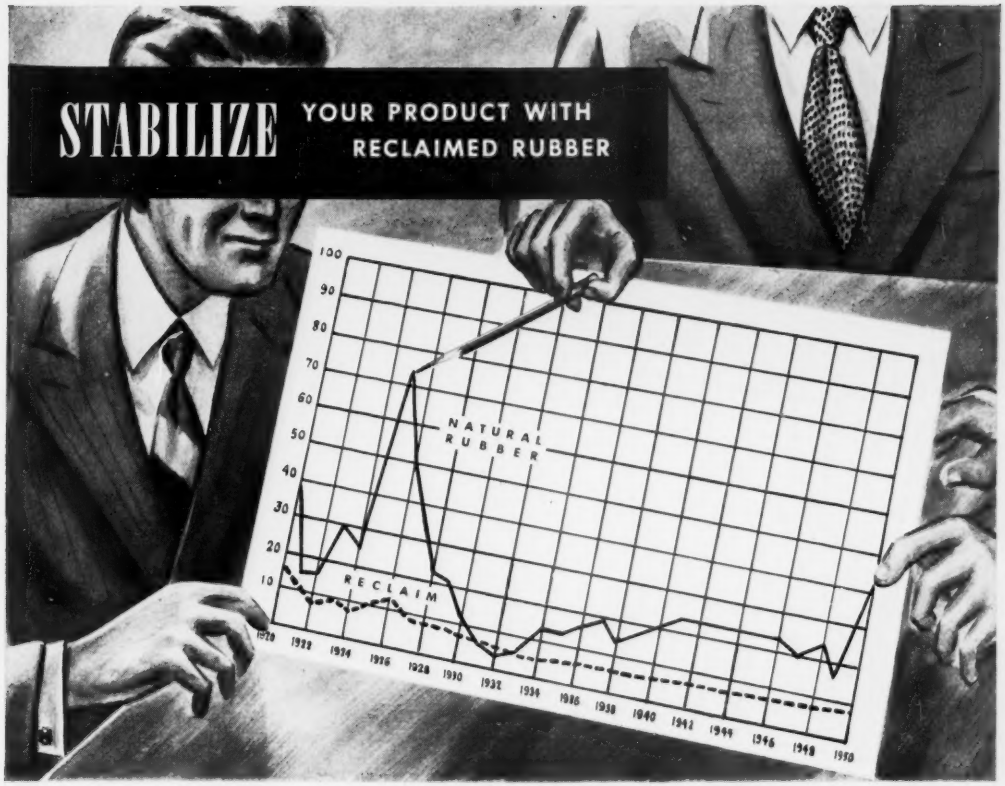
SAVE PURCHASING TIME *by ordering all your Osborn Maintenance Brushes automatically from your Industrial Distributor along with other mill supplies.*



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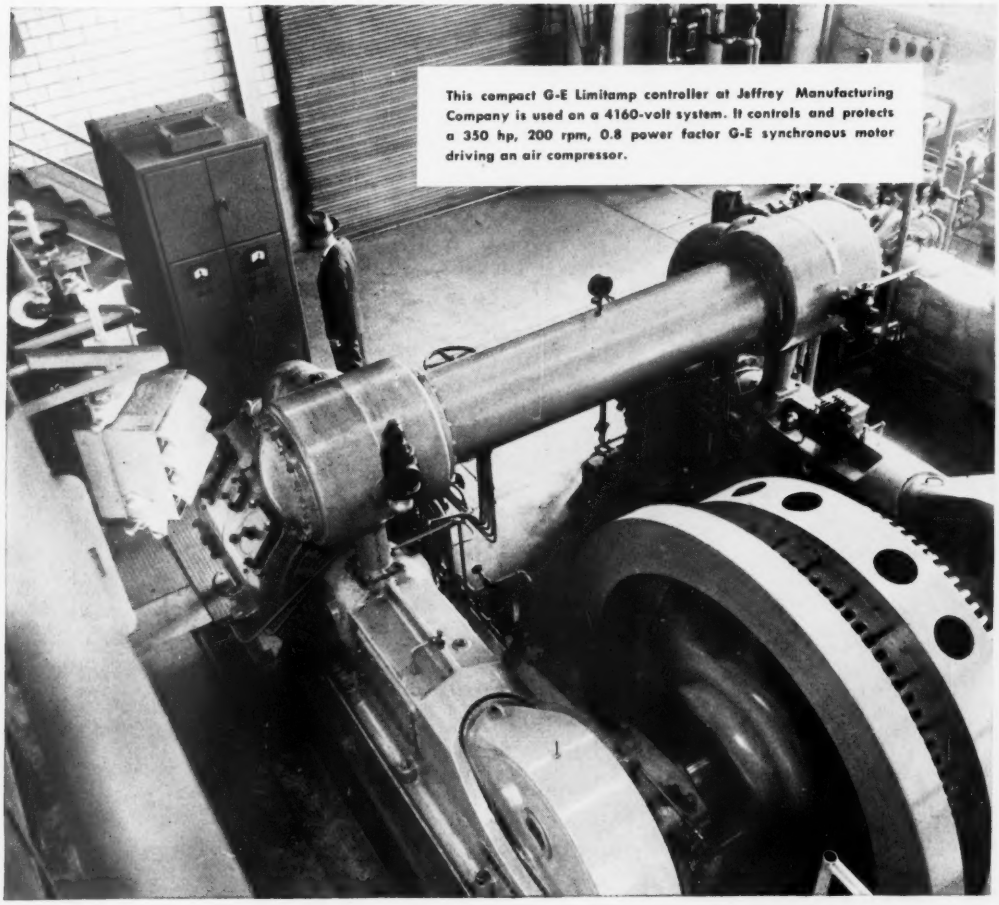
Jeffrey Manufacturing Uses G-E Limitamp Control



This compact G-E Limitamp controller at Jeffrey Manufacturing Company is used on a 4160-volt system. It controls and protects a 350 hp, 200 rpm, 0.8 power factor G-E synchronous motor driving an air compressor.

This high-voltage control meets a need for ample interrupting capacity, protection for operating personnel, good appearance and compactness

The addition of a large compressor for general plant use called for a synchronous motor and dependable high-interrupting-capacity control at Jeffery's modern power house. In addition to the accurate synchronization obtained with the new field control of this air-break Limitamp controller, and the factors mentioned above, Jeffrey likes the co-ordinated design of this G-E controller that is factory engineered and built. Such a compact, steel-enclosed controller is easily installed, requires little space —yet has all the features that provide protection for both equipment and personnel. And it's quickly inspected and maintained.

Rapid duty cycles do not affect the long life inherent in G-E Limitamp —now available in ratings up to 4800 volts with an interrupting capacity up to 250 mva. Shorts are cleared in less than half a cycle—offering positive protection for your expensive electric equipment. Write for more information on the new Limitamp controller—also available for squirrel cage and wound rotor motor control—in Bulletin GEA-5409. *General Electric Company, Schenectady* 5, *N. Y.*

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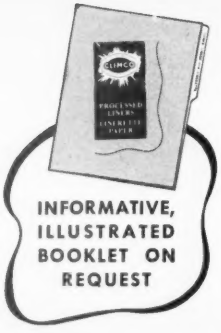

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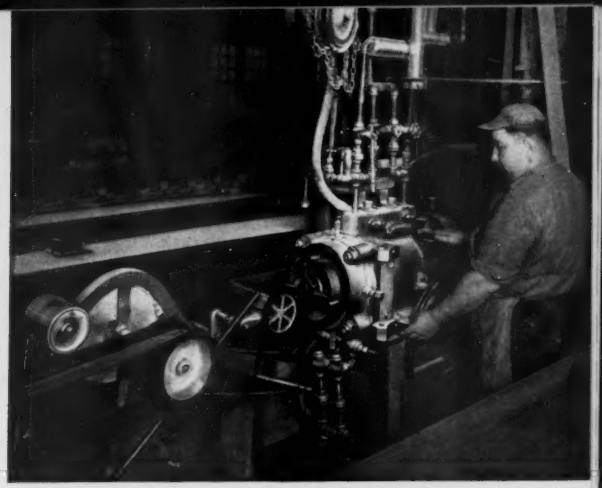
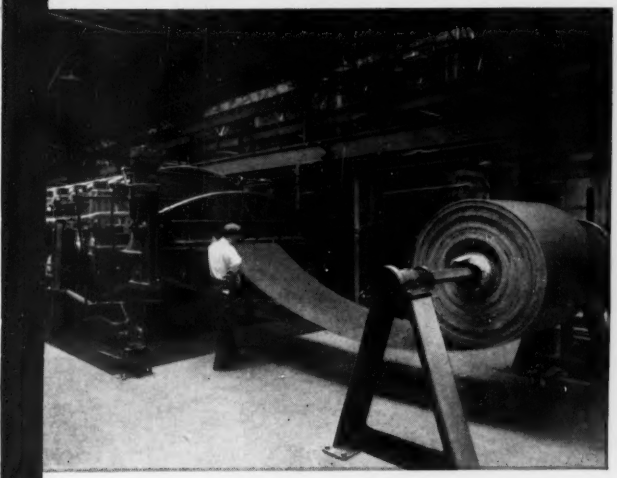


A MANUFACTURER OF MECHANICAL RUBBER GOODS eliminated costly rejects due to scorching, by switching to a Sun Rubber-Process Aid. By properly conditioning his stock—making it easier to work—the Sun aid speeded up extruding.



A MANUFACTURER OF INDUSTRIAL BELTS improved the quality of his products and cut his inventory costs $6,000 a year by replacing five competitive aids with two Sun Rubber-Process Aids. Now able to buy tankcar lots, he saves still more.

A RUBBER SPONGE MAKER changed from ordinary processing oils to a Sun Rubber-Process Aid because it did not migrate, bloom, or affect his reclaim resin-type adhesives. This extra margin of safety has greatly accelerated production.

HOW 4 MANUFACTURERS HAVE BENEFITED FROM SUN'S RUBBER-PROCESS AIDS

By switching to Sun Rubber-Process Aids, each of these four manufacturers increased the efficiency of his plant, improved the quality of his products, and effected substantial savings. The results, condensed into a few words here, are typical, not unusual. Full information on request. More and more manufacturers are turning to Sun "Job Proved" Process Aids to cut costs, speed production, improve quality. The services of a Sun technical representative are yours for the asking. Just call the nearest Sun Office or write to Department RA-7.

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Du Pont **"Alamask"** odorants
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Find out more! Send for the booklet "Odorants for the Rubber Industry"—or ask us for specific recommendations for your individual problems. Write—E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Aromatics Section, Wilmington 98, Delaware. Branch Offices: Atlanta, Boston, Charlotte, Chicago, New York, Philadelphia, Providence, San Francisco.

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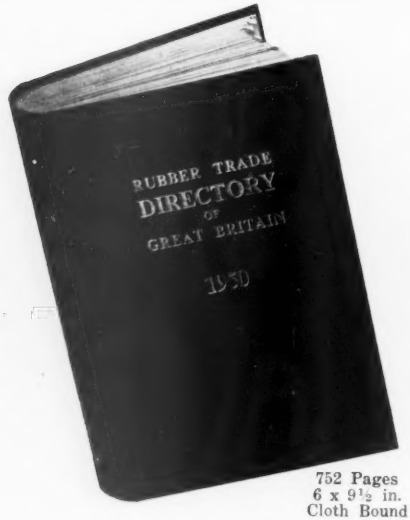

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*U. S. Patents 2,303,329 and 2,303,330.

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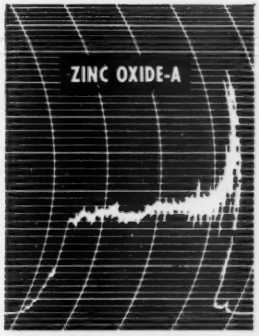
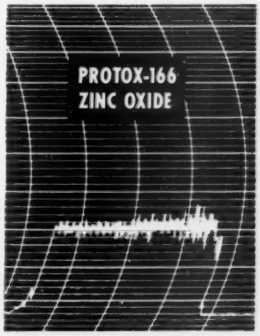
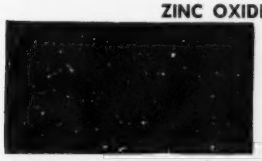


Conventional zinc oxide causes power surges at start of masterbatching.

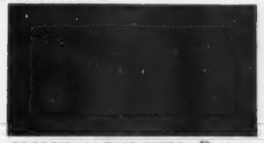


Protox zinc oxide incorporates without power peaks . . . cuts penalty payments.

ZINC OXIDE DISPERSIONS



ZINC OXIDE-A Conventional zinc oxide gives many undispersed aggregates in the short mixing cycle used here.



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RUBBER AGE

Vol. 69, No. 4 JULY, 1951

The Frosting of Rubber

Its Occurrence, Cause, Prevention and Nature

By J. T. BEAUDRY

Development Manager, Footwear Division, Dominion Rubber Co., Ltd., Montreal, Canada

THE term "frosting" when applied to rubber appears to have been fairly generally adopted to designate a particular type of bloom coming out of vulcanized rubber goods. It differs from the types of bloom caused by sulfur, waxes, etc., in that it is next to impossible to dissolve it in ordinary organic solvents or decompose it by means of the heavy inorganic acids.

The appearance of frosting has been associated by other writers with the presence of ozone in the atmosphere of the plants where the affected rubber vulcanizates have been produced. The experience of this worker is also to the effect that ozone is essential to its occurrence and that very small quantities of it are sufficient. It will manifest itself in the early stages as a simple dulling or greying of the surface and later as a definite bloom of apparently amorphous structure.

Occurrence

Frosting has been observed on rubber products cured in highly polished molds, as well as on footwear vulcanized either in air or in ammonia. It will appear sometimes as early as one or two hours after cure. At other times it will take quite a long time to appear. Air-cured footwear which had been packed several weeks has been observed to come out of cartons nice and shiny and to become frosted after a few hours of exposure to air and light. This was possibly caused by a state of sursaturation of the surface rubber with "frosting," and the slight mechanical disturbance of taking the shoes out of the cartons and handling them was probably enough to disturb the equilibrium and start the process of blooming.

Frosting is believed to be more general in Canada during the summer and winter months and not quite so much so during the fall and spring. The concentration of ozone in the atmosphere is higher in the summer on account of the electrical conditions and disturbances particular to that season. It is also higher in the winter due to the extreme dryness and perhaps the greater reflection of ultraviolet radiations from the snow. Spring and fall, with their usually high humidity, do not lend themselves to the formation of ozone in the atmosphere. These facts probably also help in explaining that further south, in the United States, frosting will appear more frequently during the summer. The southern winter is somewhat too humid to be favorable to the higher concentrations of ozone.

The thought has also been advanced that electrical motors usually present in the average mill room may produce ozone in sufficient quantities to be absorbed by the raw rubber during processing.

Note: This paper was presented by the author before the Regional Conference, Rubber Chemistry Division, Chemical Institute of Canada, Kitchener, Ontario, Canada, June 15, 1951.

Properties

Whatever substance blooms out of rubber and goes under the name of "frosting" occurs in such small quantities that this is a serious handicap in determining its nature. A number of solvents and reagents have therefore been tried on it in an attempt to at least find out to what chemical group it belongs.

It has been found to be insoluble in water, in soap solutions, alkalies, strong acids and most organic solvents. Hydrochloric acid on some specimens has been found to cause a slight effervescence suggesting a decomposition, but did not remove it completely. Oddly enough, glacial acetic acid followed by carbon bisulfide generally removes it, but not always. Either one of these solvents used by itself is ineffective. These facts suggest that "frosting" does not always have the same composition and this may have an interesting bearing on determining the processes of its formation.

From the practical point of view, and on account of the difficulty in removing it, it seems that the best method of salvaging "frosted" goods and once more restore to them the desired glossiness is to lacquer them. The average lacquer used in the rubber industry appears to have a refractive index sufficiently close to that of "frosting" to make it invisible to the human eye.

Prevention

Since the removal of "frosting" presents such a problem, it has appeared obvious that the best course of action in dealing with it would consist in preventing it. This was attempted by making a survey of the ordinary rubber compounding ingredients in order to determine whether any of them had any influence in either preventing or increasing it, and also by trying to reproduce it at will to discover the mechanism of its formation and perhaps its composition.

The ordinary compounding ingredients have been found to group themselves under the following headings:

Act as Preventives

(a) Antioxidants. These vary quite a bit in the efficacy of their action. The best ones appear to be Antox, Tonox and Permalux.
(b) Pine tar.
(c) Accelerators. Trimene and the guanidines.
(d) Alkali reclaims. Especially if they are used in conjunction with accelerators named in (c).
(e) Latex-sprayed rubber and strongly oxidized rubber.

Act as Weak Preventives

(a) Rubber resins (extracted from cheap grades of rubber). Brown crepe, acetone extraction.
(b) Fine para rubber.
(c) Montan wax.

Have No Effect For or Against "Frosting"

(a) Vulcanizing in air or neutral gases (nitrogen, carbon dioxide or molds).
(b) Accelerators. Thiuram sulfides, non-nitrogenous accelerators such as the xanthates and xanthogen disulfides, litharge, and litharge plus alkali reclaims.
(c) Waxes. Paraffin, ceresine, etc.
(d) Carbon black and the ordinary inorganic loading materials and reinforcing agents.

Increase "Frosting"

(a) Curing in ammonia.
(b) Accelerators. Insufficiency or excess of aldehyde-amines, guanidine salts, mercaptobenzothiazoles.
(c) Softeners. Rosin, rosin oil, mineral oils.
(d) Cotton flocks.
(e) Pale crepe and smoked sheets to a larger extent than the lower grade crudes.
(f) A long breaking down on the mill.
(g) Ozonizing rubber before breaking down on the mill causes more frosting than ozonizing afterwards.

Cause

The fact that frosting has been noticed to appear on vulcanized rubber articles a very few hours after cure as well as many weeks afterwards, induced the thought that only a very mild action was taking place at that stage. This could be a slow oxidation of the surface film or the slow bloom of some substance crystallizing or precipitating out of the solid solution where rubber would be the solvent.

A possible oxidation during the cure has been investigated. In a mold it is obvious that the only possible oxidation could come from oxygen absorbed by the rubber at a previous stage of processing or from the decomposition of some ingredient containing oxygen.

It seems clear that if frosting was due to oxidation during cure, the conventional air cure in compressed air would produce more frosting than a control would show if cured in either nitrogen or carbon dioxide. It has been found that samples of the same compound all frosted up in the same way when cured in either air, nitrogen or carbon dioxide. When ammonia gas is mixed with the air of the vulcanizer it seems to produce an increased tendency to frost. Possibly it reduces the solubility of "frosting" in the rubber during cure, but it would be harder to explain why frosting would show up a long time after cure when it is well known that ammonia does not penetrate very far into the rubber mass during the short time needed for the cure and that it later diffuses rapidly back into the air and disappears.

This leaves the assumption that if frosting is caused by oxidation or ozonizing, it would take place during the breakdown or the mixing operations or both.

Cotton and Busse* have previously shown that the breaking down of rubber on mills is due to its absorption of oxygen from the air. It was therefore logical to believe that frosting might be some oxidation product blooming out of the cured rubber. Two batches of an identical composition which was known to have a tendency to frost were mixed one after the other on the same mill at identical temperatures and from the same sample of crude. One mix was done by adding the powders as soon as the gum started to adhere to the front roll and the other by adding the ingredients only after the gum had been kept breaking on that mill for two hours. Only a slight frosting was observed with the first mix, while the other frosted heavily. This suggested that the most damage takes place during the breakdown as incorporation of the powders took almost the same time in both mixes.

Attempts were made to check this in the following manner: Some pale crepe (unbroken) was put in a conventional oxygen aging bomb in oxygen gas under a pressure of 300 lbs per square inch at a temperature of 60° C. This was carried out until the rubber had absorbed 20% of its own weight of oxygen. Varying proportions of this oxidized rubber were added in replacement of ordinary rubber in a test mix. Little or no

* *Ind. Eng. Chem.*, Vol. 24, p. 140 (1932) and *Trans. Inst. Rubber Ind.*, Vol. 8, p. 487 (1933).

frost was observed and increasing amounts of oxidized rubber decreased the tendency to frost.

This led to the investigation of ozone. Some rubber was ozonized by two different methods, i.e., before breaking down and after. Incorporation of these two gums in the test mix resulted in abundant frosting in the case of the unbroken rubber and moderate frosting in the case of the rubber ozonized after breakdown. This raised the question that perhaps natural rubber might absorb ozone even as early in its life as the plantations themselves, but this was rather disproved by the fact that rubber softened by heat and steam in the absence of air or ozone did not frost. The nature of conventional rubber processing itself suggests that the absorption of ozone cannot be possible to any sufficient extent except during the breaking down or perhaps the mixing operations.

At that stage of the author's investigation it seemed logical to conclude the following:

(1) If oxidation of the rubber or of one of its natural constituents is the cause of "frosting," it must be that ozone is necessary to produce it or at least to catalyze the necessary chain of reactions.

(2) Most of the absorption of ozone or oxygen takes place during the breaking down operation and very little during mixing.

(3) Since ozone exists in the atmosphere in such infinitesimal quantities and since rubber during the breakdown operation is exposed to it for such a short time, it seems fantastic to believe that such a large amount of frosting can be the direct product of ozonization, but that it would rather act as a catalyst in starting a reaction leading to very high molecular weight end-products.

(4) Frosting is highly insoluble in vulcanized rubber.

(5) Frosting appears to be inhibited by the presence of alkaline materials, such as accelerators and antioxidants.

(6) Acidic materials appear to enhance its formation, although it will also form in neutral medium.

(7) Many antioxidants are powerless to prevent frosting if they are only added during the mixing operation.

Nature

It has been found that the product which constitutes frosting has an extremely high melting point. Samples of rubber covered with frost have been heated up to 450° F. without the frost showing signs of melting. At that temperature the samples of rubber under test generally softened and became very sticky. The frost disappeared, apparently being dissolved by melting rubber.

Plantation rubber consists of approximately 95 to 97% rubber hydrocarbon together with a small proportion of natural resins, proteins, amino-proteinic acids and a small quantity of ash, consisting of inorganic salts. None of these non-rubber constituents or any of their known oxidation products have any such high melting points as has been found to be the case with "frost" or possess its high insolubility in most organic solvents. These can hardly therefore be blamed for being the source of frosting. On the contrary, crudes like Fine Para, or latex-sprayed rubber containing a larger amount of the natural non-rubber solids of latex than the plantation grades, seem to be less liable to produce frost than the latter. Possibly the ordinary coagulation and subsequent washing processes remove from the crude a portion of the natural antioxidants of rubber in the form of amino-acids or hydrolized proteins.

The possibility that "frosting" might be some oxidation or ozonization product of the commonly used organic accelerators or antioxidants has been discounted by the fact that a study of these products does not lead to the highly insoluble and high melting point products necessary to explain "frosting" and also that frosting can just as easily occur in litharge-accelerated compounds.

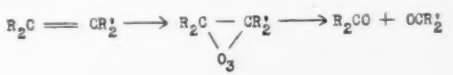
This leaves the only alternative that frosting is the end-product of an oxidation process produced or catalyzed by ozone. It would attack the rubber hydrocarbon itself or even react with the already oxidized rubber hydrocarbon. Another possibility is that ozone would be produced by the interaction of the rubber hydrocarbon and oxygen in the same processes observed in the case of other olefinic hydrocarbons such as pinene.

Up to this time the author has not been able to delve further into the study of this problem and actually reproduce "frosting" *in vitro*, starting from the rubber hydrocarbon, but an investigation has been made into the known chemistry of its oxidation or ozonization to determine whether this would lead to products answering the description of the elusive culprit as given in the foregoing.

Theory

It is well known that the rubber hydrocarbon consists of a highly polymerized diolefin, the simplest term of which is isoprene or dimethylbutadiene. It is therefore assumed that reactions applying to the simple terms of this series would also apply to the higher polymers.

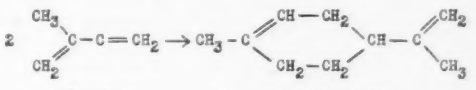
Ozone breaks up the double bonds of olefins to form ozonides which are unstable and decompose in the presence of water into two molecules of aldehydes or ketones:



Ozonides of some of the higher olefins, for instance, 1,1,5 trimethyl, 1,5 hexadiene, are known to yield laevulinic aldehyde. Diallyl's ozonide yields succinic acid. It is worth noting here that succinic acid has a melting point of about 400° F. and that it is quite possible for some of its esters to have still higher melting points. The symmetrical di- and tetra-methyl succinic acids have melting points of the order of 380° F. and 305° F., respectively. Di- and tetra-substituted succinic acids readily convert to their anhydrides with the help of some heat. The succinic anhydrides when reduced yield γ-lactones (during vulcanization sulfur dioxide is formed in the nascent state and this could easily contribute to the formation of small amounts of lactones). We can see a possibility here that upon oxidation with the air, either during or after cure, the lactone group would break up with the formation of two acid groups. Some of these dicarboxylic acids and their esters are known to have melting points ranging above 400° F. and some of the polymers should be still higher.

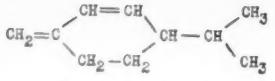
If on the other hand we follow the oxidation of the rubber hydrocarbon by oxygen from the air, we can trace the following picture:

Isoprene (dimethylbutadiene) polymerizes quite readily to dipentene and probably to other hydrocarbons of approximately the same structure:



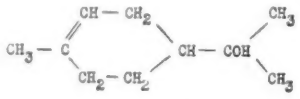
Isoprene *Dipentene*

or



β-phellandrene

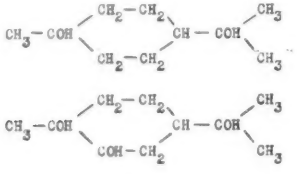
Either dipentene or β-phellandrene will oxidize easily into terpineol which has the following constitution:



Terpineol

It is believed that this represents the first stage of the oxidation of rubber by absorption of oxygen from the air because it has been noticed that after the oxidation of pale crepe in the oxygen bomb during the course of this investigation the product was quite soft and tacky and possessed a strong terpineol odor.

Further oxidation of terpineol leads to a di- and then a tri-hydroxyhexahydrocymene:

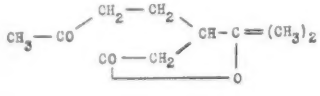


It is not inconceivable that the formation of these hydroxy compounds would account for much of the softening of rubber.

The latter composition will break up under the influence of even a weak acid, such as oxalic, and revert back to dipentene or terpinolene with evolution of oxygen. Would the weak acid needed for this reaction be the fugitive evolution of sulfur dioxide and hydrogen sulfide during the early stages of vulcanization or the succinic or laevulinic acid produced by the decomposition of the above mentioned ozonides? It is hard to say.

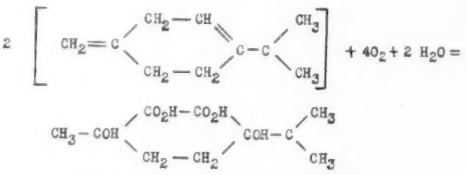
Further Possibilities

It is not beyond the range of possibilities that the oxygen liberated by the decomposition of the trihydroxyhexahydrocymene would produce a lactone by reaction with the dihydroxyhexahydrocymene:

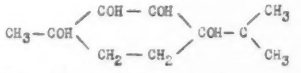


Lactones will not form in alkaline medium and this might explain the fact that if the rubber compound is alkaline, frosting will not appear because the reaction is prevented from proceeding beyond this point. Unimpeded, the reaction would continue by further oxidation of the lactones into the dicarboxylic acids previously mentioned as a possible outcome of the decomposition of a rubber ozonide. Whichever way the oxidation proceeds, with or without the help of ozone, we seem to reach the same dicarboxylic acids.

It may be of interest to note here that a tetrahydroxyhexahydrocymene has been reported by Wollack as formed through the oxidation of β-terpinene (same general constitution as dipentene and β-phellandrene mentioned above) together with α-α′-dioxymethylisopropyladipic acid:



α-α′-Dioxymethylisopropyladipic acid



Tetrahydroxyhexahydrocymene

which has a melting point of 234° C. or 452° F. This tetravalent alcohol resists further oxidation.

As previously mentioned, it cannot possibly be expected that these reactions will take place in rubber exactly as they do on products of a molecular weight of the same order as those shown in these formulas. They are shown merely as a model of the reactions which can be expected to happen on the highly polymerized products constituting the molecules of rubber.

Conclusion

The above outlined theory of the gradual oxidation of rubber to form what is known in the industry as "frosting" would not only explain why frosting will not take place in an alkaline mix, but also the light effervescence occasionally obtained with the action of a strong acid on frosting. Lactones and particularly carboxy-lactones will split off CO_2 when attacked by strong acids.

Some of the intermediate terms of oxidation of rubber are volatile and this might explain the pitting of the cured rubber surfaces occasionally observed.

The previously mentioned alternative of the production of ozone through the oxidation of the rubber hydrocarbon would more easily explain the comparatively large amounts of frosting formed during breakdown as opposed to the very minute quantities of ozone in the air. This is not impossible when one considers that pinene, the main constituent of turpentine, has been observed to oxidize by simple contact with the air with production of a certain amount of ozone. It may be that rubber while being broken down in contact with air will also behave similarly.

These theories on the oxidation of the rubber hydrocarbon are not offered as absolute certainties, but it is hoped that they may prove of some value in explaining known facts. They are perhaps steps in the right direction and they are presented with the thought that their exposé will lead to more definite conclusions.

Sodium Polyacrylate as a Latex Thickener

By W. D. SCHROEDER and G. L. BROWN

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SODIUM polyacrylate has been offered as a latex thickener under the trade name "Acrysol GS" since 1944. The current product is supplied as an aqueous solution containing 12.5% of the polymer, and is essentially free of impurities. This material supplants an earlier grade which contained approximately 2.5% sodium sulfate in addition to the 12.5% polymer. Acrysol GS has found wide adoption as a latex thickener. A large number of screening tests have been conducted during the development of the product for this use, and are reported here in part.

Although a large number of materials are suggested in the patent literature as thickeners, there is little evidence that many of them have achieved commercial utility, and no data are available relative to most of them. Silvernail *(1)* has reported viscosity studies of methyl cellulose, sodium carboxymethyl cellulose, casein and hydroxyethyl cellulose in a variety of latices. Dales and coworkers *(2)* have studied the effect of proteins, starch, gum arabic and cellulose derivatives in neoprene latex. Interest in thickeners for styrene type latices has recently been spurred by the success of polymer emulsion wall paints *(3)*. The application of polymers and copolymers of acrylic acid as thickeners for textile printing and as sizing agents has been known for some time *(4, 5)*.

Evaluation of Latex Thickeners

A laboratory worker faced with the necessity of comparing the activity of water-soluble polymers as latex thickening agents finds that his selection of evaluation techniques is almost completely arbitrary. The latex type and concentration, the pH, and the compounding ingredients all have specific effects upon the activity of the soluble polymer. The variety of compounded systems in which a thickener may be used is so great that a simulation of end use conditions would be a task of imposing magnitude.

Although screen testing less complicated than a duplication of use conditions is desirable, oversimplification must be avoided. The viscosity of an aqueous solution of a polymer as a function of concentration is an easily determinable property, and this information is available for most of the thickeners offered commercially. It is our conclusion, based upon the comparison of a large number of chemical and physical variations of these products, that the viscosity in water does not correlate satisfactorily with the viscosity in latex. This simple measurement would provide a very misleading guide for product development or for setting product specifications. Two materials which exhibit comparable viscosities in water may differ several fold in their contribution of viscosity to a latex.

In addition to latex viscosity measurements, properties of interest in testing a latex thickener would include the following:

Comparative Thickening Efficiency: Under the conditions of use, the relative thickening efficiencies of two materials should be judged by the amounts of the materials needed to achieve the desired viscosity. Since viscosity does not in general have a linear dependence upon the concentration of the thickener, a comparison of viscosities at equal concentrations would give a different, and misleading, index of efficiency. The pertinent question is, "How much additive is required to achieve the desired effect?"

Film Properties: The influence of the thickener on the uniformity, clarity, strength, and water resistance of the final product is of great importance.

Concentration for Incorporation in Latex: Most polymers must be diluted below a characteristic concentration before mixing with a latex. More concentrated solutions may cause local precipitation due to dehydration or salt effects, or may be difficult to mix to give a homogeneous combination. Other things being equal, the material which may be incorporated at the highest concentration is preferable.

Other Rheological Properties: The time dependence of viscosity may be of great importance, although the latex user may evaluate them only in a qualitative manner. These properties include thixotropy, pseudoplasticity, and the yield value.

Investigations in our laboratories of the properties of Acrysol GS, a sodium acrylate type latex thickener, pro-

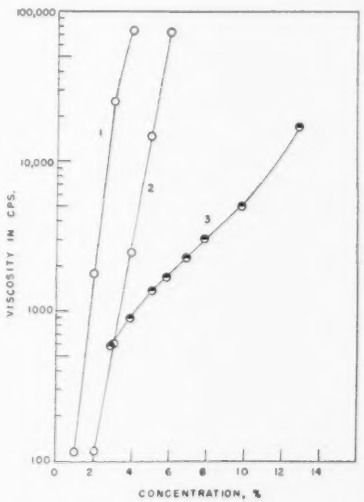


FIG. 1—Comparison of the viscosities of aqueous solutions of (1) a high viscosity grade of sodium carboxymethyl cellulose, (2) a medium viscosity grade of methyl cellulose, and (3) Acrysol GS.

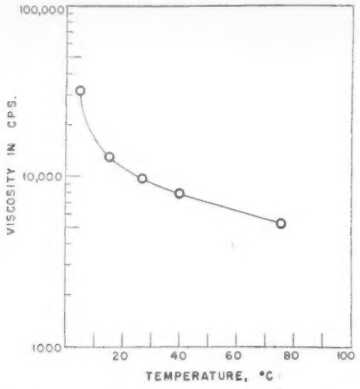


FIG. 2—Dependence of the viscosity of an undiluted (12.5%) solution of Acrysol GS on temperature.

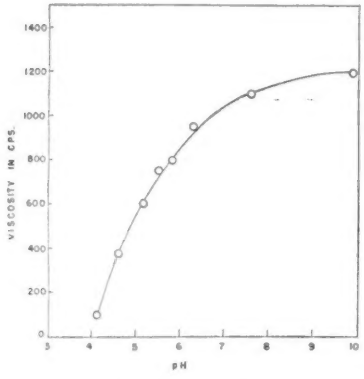


FIG. 3—Effect of pH on viscosity.

vide but a part of this information. It is hoped that standard methods will in time be developed for the description of further properties of this and other materials.

Experimental Procedure

Acrysol GS was diluted to 5% with water, except where otherwise specified, and incorporated in latex by slow addition of the latex to this solution, accompanied by thorough stirring. Samples were conditioned for 24 hours at 68°F., and viscosities determined with the Brookfield Viscometer, Type LV. Values reported here are those obtained at 12 rpm.

Production batches of Acrysol GS were used. The latices employed and their suppliers were as follows: Natural Latex NC-401, GR-S Type IV, and GR-S Type 359—Naugatuck Chemical Division, U. S. Rubber Co.; Dow 512-K Latex and Saran F-122 A-20—Dow Chemical Co.; Rhoplex ER, MR, FRN, WN-80, WN-75, and FRN—Rohm and Haas Co.; Polyblend 550 x 20 and Hycar OR-25 No. 1552—B. F. Goodrich Chemical Co.; Neoprene 571—Rubber Chemicals Division, E. I. du Pont de Nemours & Co.

Experimental Results

Viscosity of Aqueous Solutions: Figure 1 presents a comparison of the viscosities of aqueous solutions of Acrysol GS (curve 3), a medium viscosity grade of methyl cellulose (curve 2), and a high viscosity grade of sodium carboxymethyl cellulose (curve 1). With Acrysol GS, the viscosity increases much less sharply with concentration than for the two cellulose derivatives. Thus, at concentrations desirable for incorporation into latex, the GS is more easily handled, whereas at lower concentrations representative of final use levels, the viscosity is still relatively high.

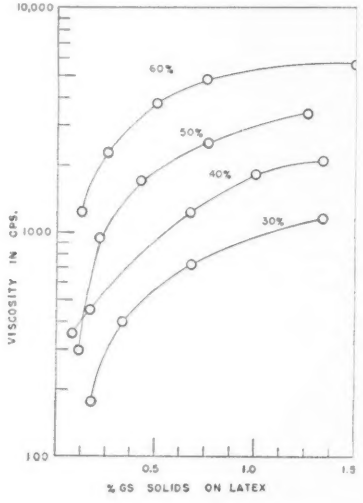


FIG. 4—Effect of adding increasing amounts of Acrysol GS to natural latex.

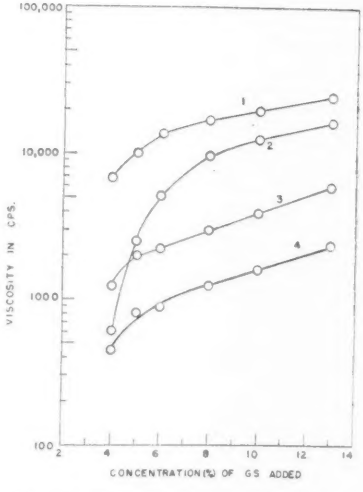


FIG. 5—Effect of Acrysol GS on constant latex solids.

The dependence of the viscosity of an undiluted (12.5%) solution of Acrysol GS on temperature is shown in Figure 2. At relatively low temperatures, the viscosity depends sharply upon temperature, but a much less pronounced dependence is found at normal use temperatures.

In the alkaline region, the viscosity of a 5% solution of Acrysol GS is affected only slightly by changes in pH. In the acid region, the viscosity drops fairly sharply with decreasing pH, with precipitation of the acid form of the polymer occurring below a pH of 4.5. Figure 3 presents the effect of pH on viscosity. Hydrochloric acid (as a 12% solution) was added to decrease the pH. The resulting sodium chloride was allowed to remain in the solution, and may have accounted for part of the viscosity decrease.

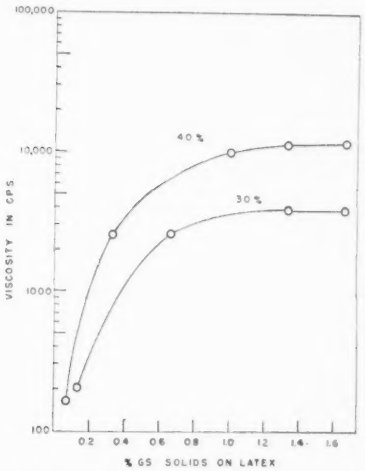


FIG. 6—Effect of increasing amounts of Acrysol GS on 30 and 40% natural latex.

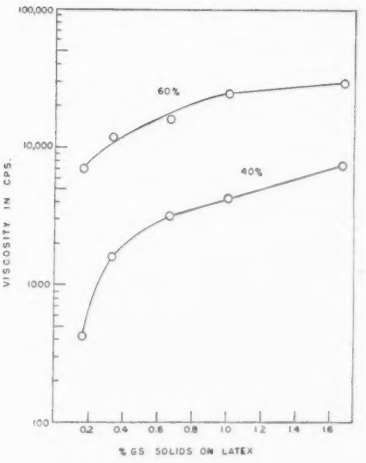


FIG. 7—Effect of increasing amounts of Acrysol GS on GR-S X-359.

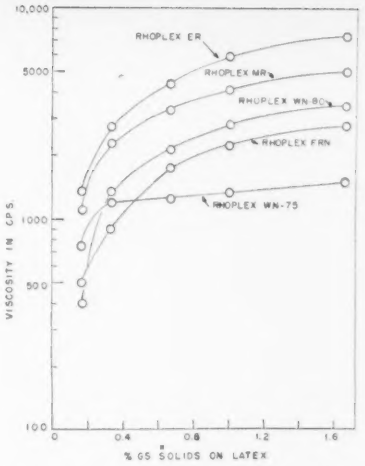


FIG. 8—Effect of Acrysol GS in Rhoplex (polyacrylic) emulsions.

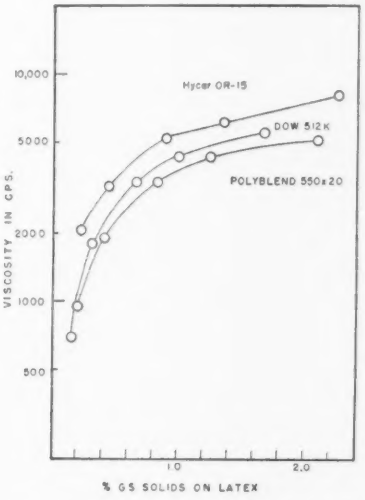


FIG. 9—Effect of Acrysol GS in Hycar OR-15, Dow 512-K, and Polyblend 550 x 20.

Natural Latex: The effect of adding increasing amounts of Acrysol GS to 30, 40, 50 and 60% natural latex is shown in Figure 4. The viscosity increases rapidly with initial addition of thickener, but begins to level off in the range 1.0 to 1.5% Acrysol GS on total latex. Since GS is added to the latex as a 5% solution, the latex is being constantly diluted, and the very large initial thickening effect is decreased as the dilution effect becomes more predominant.

Although this method represents the practical method of combination, it is interesting to observe the effect of the thickener in a system of constant latex solids. Curves 3 and 4 in Figure 5 depict the increase in viscosity with

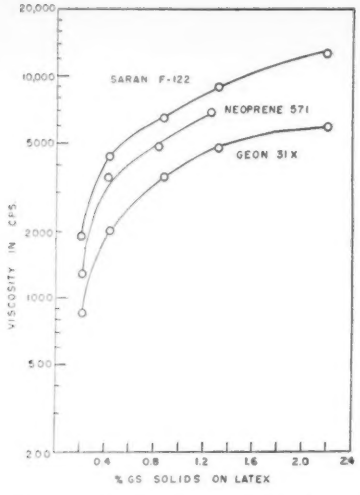


FIG. 10—Effect of Acrysol GS in Saran F-122, Neoprene 571, and Geon 31-X.

added GS, with this dilution effect eliminated. Here 20 grams and 6.65 grams of Acrysol GS solution of various concentrations in water have been added to 100 grams of 40% natural latex. Following an initial sharp rise, the viscosity assumes a logarithmic dependence upon the Acrysol GS concentration.

GR-S Latex: The effects of Acrysol GS on the viscosity of GR-S Type IV latex are shown in Figures 5 and 6. The viscosities of 30 and 40% latex to which increasing amounts of 5% Acrysol GS have been added are plotted in Figure 6. As with natural latex, the initial additions of the thickener show pronounced thickening, but dilution effects result in a leveling of the activity with greater additions.

Curves 1 and 2 in Figure 5 show the thickening efficiency at constant latex solids. GR-S latex of 40% solids is treated with 20 and 6.65 grams of Acrysol GS of increasing concentration. Effects are similar to those in natural latex, although the viscosity level is higher.

The viscosity of GR-S X-359 with increasing additions of 5% Acrysol GS is depicted in Figure 7.

Acrylic Emulsions: Thickening effects in five Rhoplex (polyacrylic) emulsions are compared in Figure 8. The anionic emulsions, Rhoplexes ER and MR, are imparted considerably higher viscosities than the nonionic emulsions, Rhoplexes WN-80, FRN and WN-75, by equal additions of thickener. At least part of this is due to the greater concentration of the former, which are supplied at 50% compared with 40% for the latter.

Other Synthetic Latices: The viscosity effects of Acrysol GS in six synthetic latices—neoprene, Hycar, Polyblend, Saran, Dow 512-K and Geon 31-X—are depicted in Figures 9 and 10. Here again the Acrysol GS was diluted to 5% before incorporation.

TABLE I—BROOKFIELD VISCOSITIES AT FOUR SPINDLE SPEEDS

Latex	% Acrysol GS on Total Latex	Spindle Speed 6	12	30	60
40% GR-S Type IV	0.333	4100	2550	1400	890
40% Natural	0.333	1300	800	440	290
40% GR-S X-359	0.166	700	420	220	160

Effect of Spindle Speed on Viscosity

Viscosity values for a spindle speed of 12 rpm are presented in the graphs. In all cases, determinations were made at 6, 12, 30 and 60 rpm. When the viscosity values are plotted against spindle speed on log-log paper, a straight line results, indicating the following relationship:

$$\log N = \log a + b \log R$$

or

$$N = aR^b,$$

where N is the viscosity, R the rate of shear, and a and b are constants. If the relationship held over the range to R = 1, then

$$\log a = \log N \text{ at } R = 1.$$

In Table I, several examples are given of the values obtained at all spindle speeds.

LITERATURE REFERENCES

(1) Silvernail, *Paper Trade J.*, Vol. 32, p. 246 (1949).
(2) Dales et al, *India Rubber World*, Vol. 107, pp. 565-67 (1943).
(3) McCullough and Sullivan, *Paint Ind. Mag.*, Vol. 66, pp. 10-12 (Jan., 1951).
(4) Gerber, *Melliand-Textilber.*, Vol. 20, pp. 286-87 (1939).
(5) French Pat. 847,203, to I. G. Farbenindustrie, A.-G. (Oct. 5, 1939).

An improved, low-cost **universal testing machine** of 12,000-pound capacity has been announced by the Baldwin-Lima-Hamilton Corp., Philadelphia, Penna. One of the features of the new machine is that the hydraulic loading unit is separate from the indicating and control unit, which isolates recoil from breaking test specimens and permits adjusting maximum or lazy hands with minimum drag.

Aldrich Pump Co., Allentown, Penna., has announced the addition of a **6-inch stroke direct flow pump series** to its line. Ranging from 300 to 900 h.p., the new series covers numerous applications, such as chemical handling, lean oil pumping, etc. The pumps feature inverted design and a direct flow fluid-end. All wearing parts are interchangeable.

Designed for accurate milling, routing and engraving completely around cylinders and rolls, a new type of **pantograph machine** has been introduced by the George Gorton Machine Co., Racine, Wisc. In operation, the new unit accommodates rolls from 6 to 12 inches in diameter and up to 40 inches long. The work piece is held between centers as on a lathe. Movement of the tracer forward and back automatically rotates the roll.

Symposium on Applied Finishes for Rubber Materials

A SYMPOSIUM on Applied Finishes for Rubber Materials was the highlite of the Fall Technical Meeting of the Southern Ohio Rubber Group held on September 14, 1950, at the Engineer's Club in Dayton, Ohio. Speakers at the symposium, which was followed by an interesting question-and-answer period, included Robert F. Wysocki, technical director, Forbes Varnish Division, Pittsburgh Plate Glass Co., Cleveland, Ohio, who spoke on "Soft Rubber Finishes;" H. R. Bennett, manager, industrial sales, Thresher Paint and Varnish Co., Dayton, Ohio, on "Hard Rubber Finishing," and M. J. Gordon, president, Gordon Paint Co., Mansfield, Ohio, who acted as moderator and discussed "Tailoring the Finish to the Job and the Job to the Finish." Two of the three papers presented in the symposium are published herewith.

Hard Rubber Finishing

By H. R. BENNETT

Manager, Industrial Sales, Thresher Paint and Varnish Co., Dayton 1, Ohio

THE greater portion of our experience has been in the finishing of hard rubber steering wheels for automobiles, trucks, tractors, boats and aircraft, and it will be this type of rubber compound which will be discussed. A little of the history of the development and an outline of the manufacturing process will be of help in understanding some of the problems involved in producing satisfactory finishes for steering wheels.

Steering wheels have progressed from a crude beginning along with the automobile. The original wheels were made of wood by carriage wheel shops. Initially, they were wrapped, using wood strips and glues. After very short usage in the open cars of that period they unwound. Next, they were made of small strips, grooved and glued together, then sanded into shape. These wooden wheels were stained and given two to three coats of varnish. Then, in the early 30's the molded rubber wheel made its appearance.

Introduction of Rubber Wheels

The first molded rubber wheels were finished with two to four coats of black lacquer, but in 1935 baked enamels were put to use. Shortly thereafter colors were employed to match or harmonize with the interior color schemes of the cars. The lacquer-coated wheels gave 6,000 to 7,000 miles of service. The early baked enamel wheels gave 7,000 to 15,000 miles. Today, under normal conditions, the finish on hard rubber steering wheels will give exceedingly high mileage. For example, truck and bus steering wheels finished for rough, daily use last well over 100,000 miles.

The procedure varies in detail with various manufacturers, but basically the process is as follows: The steel insert or spider is formed, welded and the rubber molded around it under sufficient pressure and temperature to cure the compound. The molded rubber wheel then goes to the rubber finishing department where the flash is removed and the wheels sanded to a smooth surface. After passing inspection the wheels are ready for the washing machine to remove mold soap and other loose foreign matter on the surface. The hard rubber wheels are now ready for their coat of synthetic baked enamel.

There are several systems, all basically the same. The following baked process will illustrate general procedures: First, the hard rubber wheels are preheated to 180° F. which permits heavier coats of enamel to be applied in one coat. A two-coat system is recommended for service mileage. These may be applied by hand spray or automatically; both systems are successful. The advantages of electrostatic spray over hand spray include uniformity, paint saving and faster production. These all add up to a lower unit cost.

Stand out time or time from the spray to the oven is an important factor in the type solvents used in the baking enamels. Finished parts entering the oven too fast will cause pinholes, due to trapped solvents. Here again enamels must be formulated to the customer's conditions. Baking cycles are around 275° F. for 60 minutes. Synthetic enamels are thermosetting and temperatures above 265° F. are recommended.

Role of the Compound

To grasp some of the difficulties encountered by the paint chemist in finishing rubber goods, it must be remembered that hard rubber compounds generally contain various percentages of natural rubber, reclaimed rubber, accelerator, sulfur, asphaltum oil, mineral rubber, wood flour, iron oxide and whiting.

The bleeding characteristic of still pitches or mineral rubber is well known. The non-drying asphaltum oil increases the bleeding of the mineral rubber by making it dissolve more readily into the enamel film applied over it. For this reason we try to set our film as quickly as possible. This also helps to prevent the sulfur and

accelerator from retarding the drying and causing further discoloration. If the compounder replaces the natural rubber with one of the synthetic rubbers, such as GR-S, and is not careful about reclaim, he is really in for trouble. The paint chemist has found a worthy opponent in the rubber chemist. In the past 16 years we have tried to paint compounds containing the by-products of the mineral, vegetable and animal kingdoms.

Problem of Adhesion

There are many materials used in rubber compounds today that play havoc with the adhesion, color, cure or hardness of paint film. Poor adhesion of enamel films to hard rubber compounds is sometimes hard to correct. To say the trouble is always in the enamel would be just as unfair as to say the compound is always at fault. Enamels should easily wet the surface of the compounds so as to become a part of the compound itself. Too fast drying in the enamel will cause poor adhesion. Compounds in the past have caused a lot of headaches.

The rubber chemist will try anything in the compound or on the compound to get the end-product out of the molds. Once in a while in order to keep the line running one of these ideas will go to production. Up goes a cry for help and we hear that our paint lacks adhesion. We carefully check the batch in question in our controll department and after we find everything satisfactory in that connection, we start out for the customer's plant. We wonder what in the world the compounder has found new to throw in his batch.

We generally have excellent cooperation in our efforts to find the trouble. One of the most common causes for poor adhesion is the type of mold release or soap. Care in cleaning this soap from the surface before painting is very important. The type of cleaning solution to use depends on the type of release used on the molds. Hot alkali wash is generally used followed by a hot water rinse.

Another cause for poor adhesion is sweating of the materials used to give flow in the mold. We have found oil still pitch and stearic acid to be among these materials. This sweating happens after the part is sprayed and during the baking cycle of the first coat of enamel. The result is poor adhesion between the compound and the enamel. However, conditions will vary and this trouble will also show up between the two coats of enamel. On one type compound formulation, the first coat of enamel will bond perfectly to the compound, absorbing the sweat out. Due to the presence of oils or waxes that were absorbed into the first coat a good bond is not obtained between the two coats of enamel. This is termed "lamination" of enamel films. We are able to overcome this by reducing the baking cycle for the first coat and curing both coats at one bake.

Other compounds containing stearic acid, wax, Parolite, etc., present problems in holding good adhesion on aging. Under-cured stock with frost on the surface or free sulfur will retard the cure or baking hardness of most enamels. Combinations of sweat-out materials can also cause poor adhesion.

Staining or Bleeding Difficulties

Next we come to problems of staining or bleeding. We have not been able to overcome this problem satisfactorily with baking enamels. Light colors are most affected; tan, brown and black are the least affected. Reclaimers are doing an excellent job on this problem. Closer control of raw materials and reclaimed rubber has lessened the problem considerably.

Bleeding of the compound through the baked finish can generally be stopped by the use of a special type of sealer. We do not, however, recommend it for durability where the finished product will be exposed to the elements or get considerable handling. Accordingly, if the compounder must work with bleeding or staining stock, it is preferable to paint the end-product black or at least with dark colors. Chemists working with window strips for automobiles know how important stain control is where light colored cars are concerned. This same staining process is accelerated during the baking cycle when the compound is coated with enamel.

Cure or hardness of paint film will vary with different compounds. Since it is difficult to determine where hard rubber stops and soft rubber begins, we have a flexibility problem. Another factor in hardness of the film is porosity or lack of denseness of the compound. This determines how fast we can set the surface and cure our film in the bake. If we set too fast we have blisters, and if we are too slow we will not cure through.

A pound or two of sulfur cooked into 100 gallons of china wood oil will convert the oil to a non-drying dark oil. This same reaction takes place when free sulfur is present on the surface of the compound and the surface is coated with enamel and baked. The same darkening of the oil takes place in the enamel. Also, the enamel will require more heat to cure it and more heat means further discoloration. It helps the paint chemist to have a sample of the product to be finished. He can help to overcome some of the problems by pigmentation and liquid formulation if he knows the entire problem in advance.

Porosity of the rubber compound will cause pinholes, blisters and loss of gloss. Where these conditions cannot be corrected in the molding of the compound, another compromise in the enamel formulation has to be made. Pinholes and blistering are generally due to trapped solvents from the enamel which have soaked into the porous surface of the compound. To eliminate the trouble, the initial set of the film is retarded, allowing the vapors to free themselves while the enamel film reflows.

Preferred Testing Methods

Accelerated testing methods of hard rubber finishes have certainly taken the paint chemist over the hurdles. Various types of abrasive machines were developed, until recently the test requirements were so severe the paint chemist had to formulate enamels to bake very hard. There was little life left for aging and complaints from the field were received on cracking. Some of these test machines served their purpose in the early stages of development of hard rubber finishes. Later improvements in formulation of hard rubber finishes, however, have proven them obsolete. Actual service tests have proven to be the solution. There are many factors which cannot be duplicated in accelerated tests and these factors play a vital part in durability and appearance of the product.

Molders of rubber products are now faced with allocations on some of their raw materials. The manufacturers of hard rubber finishes have similar allocations. This is a problem with which both industries are familiar, since quite a number of rubber compounding ingredients are the same as those used in paint formulating. If we bear with each other in these trying times, it is certain that we will produce finished products of the best quality possible with the raw materials available.

Tailoring the Finish to the Job and the Job to the Finish

By M. J. GORDON
President, Gordon Paint Co., Mansfield, Ohio

THE finishing of rubber products with organic coatings in black, white and all colors of the rainbow, has been a fairly general practice for many years. Tires, tubes, steering wheels, electric cable, belting, motor mountings, grommets, dolls, balls and toys of every description have been painted in volume running into the millions of units.

Because of the individual characteristics of the many rubber compounds as compared to the more generally known and fixed nature of metal and wood products, the paint chemist or formulator is confronted with a challenge with each rubber finish problem. In the tailoring of a finish for application to metal or wood he can depend on the experience gained over years by others before him, or from the many chemical and resin makers who have spent years developing their products for just this purpose, and also on the experience of the users. With rubber, however, he most generally has a new surface to combat and new complications to overcome with each compound.

Consideration of the Surface

Where the consideration of flexibility is not a major factor, such as so-called hard rubber objects, it is obvious that the surface characteristics may be treated as similar to metal or wood. Particular attention is given here to proper adhesion, hardness of film and utility requirement or color retention. These properties are obtained by the selection of suitable alkyd resins and compounding them with either nitrocellulose for air-drying materials or blending them with urea or melamine resins to produce a baking enamel. Possible bleeding out of any foreign matter from the rubber into the paint film must be checked as well as the degree of heat which the particular compound will stand without blistering. The tailoring of a finish for this type is more or less routine and often, with some consultation with the rubber compounder, excellent films can be developed.

As the durometer of the rubber compound decreases, the complexity of the finish problem increases in proportion to the ultimate degree of flexibility required of the finished part as well as maintaining good adhesion and the functional purpose of the film, such as sealing properties, resistance to gasoline, oil, etc. By working in close co-operation with the rubber compounder and finishing foreman, finishes have been produced which stretch from 500 to 600 percent on rubber, and many times the rubber breaks before the film shows any sign of cracking.

Tire manufacturers have been using paint products to dress up their tires and tubes for many years. Years ago many of them encountered considerable "blushing" on the tire surface as it left the mold, creating a mottled appearance which made the sales department unhappy. No doubt a compound change such as a possible increase in carbon black or the use of a better grade of black could have overcome this defect. However, this would represent a much higher cost than the subsequent application by spraying of a thin coat of fast drying paint as a final operation. This coating produced a uniform appearance for all the tires coming off the production line and was formulated to disappear after a few miles of driving wear without cracking.

While many users have discontinued the use of a finish with improved molding conditions many still use an over-all paint for better appearance. Striping of the tire, insignia, trade-marks and other decorative uses are still in practice. For that ragged edge where the white sidewall meets the tire bead, a flexible rubber brushing finish has come to the rescue to cut the cost of considerable buffing.

Prior to World War II, a couple of the major tire manufacturers presented the then-very-new blowout-proof tubes. For decorative and advertising purposes these tubes were finished with colorful metallic lacquers which flexed as the tube was inflated and served their purpose very well until war shortages forced their discontinuance.

The earliest use for a paint finish on steering wheels for the automotive industry was primarily to seal the rubber surface so as to prevent the carbon black and mineral rubbers from rubbing off on the driver's hands and especially the white gloves of the lady drivers. With a finish then becoming an integral part of rubber steering wheels, and with increased color demand for car interiors, greater attention is now paid to wearability of the finish, beauty and depth of color.

The compounds used for this purpose, being in the hard rubber range, offer a wider scope to the paint formulator. He blends the synthetic resins of the alkyd group with melamines for maximum abrasion resistance. The finish must be capable of resisting the corrosive

Paint finishes are widely used on playballs of this type.

action of human perspiration. While a hard finish for abrasive action is desirable, it cannot be too hard, for the action of such objects as finger rings could chip the paint. It is common for users of this finish to expect the surfaces of these wheels to last from fifty to one hundred thousand miles of driving wear.

Organic coatings have been used for many years on high and low tension electric cable. Its purpose here is to form a thick skin to seal and prevent leakage of electrical current. Naturally, flexibility maintained through wide margins of hot and cold temperature changes occuring in this field is an important requirement. As many as fourteen coats are often applied by a dipping procedure so that rapid drying of the film is essential. When nitrocellulose lacquer was first used in this work, it was found that for production purposes a slippery surface was essential to proper operation because the cable would cut the hands of the inspectors as it passed through their inspection operation, and also had a tendency to mass together as it was rolled up on continuous spools. By incorporating a very small amount of oil into the lacquer, which had the property of almost immediately diffusing to the surface of the lacquer surface and yet not affecting the drying quality, a slick slippery surface was created, thus eliminating both problems.

Use on Automotive Products

In the field of oil and gasoline resistance, flexible lacquers have played a big part on motor mounts, grommets, etc., used in the automotive industry today. Although synthetic rubbers, such as neoprene, are used extensively by the rubber industry there are many places where the properties of natural rubber and latex are more suitable and desirable and yet the end-product must be in contact with these destructive solvents. The millions of rubber products which have been successfully coated for this purpose attest to their usefulness.

From a purely decorative standpoint, the rubber toy industry probably is the greatest user of paint finishes for coloring and decorating the many thousands of dolls, balls, animals and toys on the market today. This is a highly competitive business in which cost figures are closely watched. Compounders guard their formulations closely and seem to be constantly changing them not only for adjustment of properties but to cut costs.

In this industry the finishes developed for application to balls, both inflated and sponge, offer the greatest challenge to the paint formulator. Not only does he have to cope with the various changes in antioxidants, fillers, plasticizers, etc., but he is also faced with "bounceability," permeability of gas in the inflated ball, and the effect of aging on the ball. All the features of flexibility, color, gloss and drying speed must be incorporated into this type of finish. After formulating a product to satisfy these requirements on the compound it has often been disappointing to find that its application on a ball which, in the unfinished state would bounce to the ceiling, caused the ball to be "dead" and have very little bounce to it. At elevated temperatures, inflated balls lose small amounts of their gas, and if the paint film securely seals the surface so that these escaping gases cannot permeate the film, some blistering of the film appears.

The effect of some antioxidants on many pigments used in compounds is well known. The choice of pigments used in making up the various colors of the finishes in use is very important. I recall one instance where several thousand balls were finished with a lacquer containing an iron blue pigment which was selected to match a requested color. Exposure tests over a period of a few weeks in sunlight had been conducted before the balls were painted in production. However, when the customer opened the containers shortly thereafter, the balls had changed from blue to various shades of green. Here was a case where the pigment had been unaffected in sunlight but was unstable on the compound when kept in a dark place. A change to Monastral blue corrected this error which could have been avoided if the paint and rubber chemists discussed this feature prior to formulation, since it had been obvious to the rubber formulator.

Finishes for balls and most other toys are usually applied by spray application, but many of them are suitable for dipping. Rubber and synthetic rubber coatings pigmented and compounded for spraying application are also available and in use on these products.

The importance of cooperation between the rubber and paint chemist in the quest for the proper and best finish for use on rubber products cannot be over-emphasized. Because a coating is highly satisfactory for one user does not necessarily make it adaptable to another, even though it may be an almost identical product or serve the same use.

Inasmuch as it is not always possible for intimate discussions on each compound formulation, the experienced paint chemist requires a sample of the particular compound on which to test the finish he expects to tailor. Then, if through trial and error, he can prevent it from bleeding, get it to dry despite the wax used in the compound, and, finally, if his latest difficulty, the silicone compounds which are used in the molding process and which prevent satisfactory drying, can be overcome, he will eventually produce a satisfactory finish for either functional or decorative purposes.

Additional Reports of Avoidable Accidents

ADDITIONAL reports of avoidable accidents in rubber factories, taken from the Safety Newsletter issued by the Rubber Section of the National Safety Council, follow herewith:

Cigarette Lighter Causes Lost-Time Accident: A most unusual accident occurred in a fuel cell testing department when a worker dropped his lighter from his pocket, which in turn ignited his clothing. The worker had stooped over, the lighter slid out of his pocket, struck the floor and ignited some kerosene-saturated rags on the floor. He attempted to tramp the fire out, but his own trousers, on which he had spilled some kerosene, also ignited, causing first and second degree burns to both his legs. It was necessary to call the fire department to extinguish the fire. Notices have been posted in this department restricting the use of cigarette lighters. The workers have also been called together and told about the accident so that such an occurrence need never be repeated.

Mortar and Pestle Explodes: A chemist had been assigned the task of synthesizing organic compounds to be used as blowing agents in rubber plastics. These compounds release nitrogen on heating in the presence of plastisol to give a very desirable product. Mixed phthaloyl azides were being ground in small amounts, by means of a mortar and pestle. A violent explosion resulted. The explosion caused severe damage to the left hand of the worker and a cut tendon in the small finger of his right hand. The technique of pulverizing azides was discontinued immediately and will not be permitted in the future.

The Contribution of Compressed Air to Better Production and Improved Labor Relations

By E. B. ERICKSON

Plant Engineer, United States Rubber Co., Los Angeles, Calif.

Compressed air, properly used, plays an important role in many rubber manufacturing operations. Some of these applications were covered in our April, 1948, issue in the article entitled "Compressed Air in the Manufacture of Tires and Tubes." The current article amplifies several of these applications in the Los Angeles plant of the United States Rubber Co. and is supplementary to the previously published data.—Editor.

THE great strides American industry has made in turning unpleasant jobs into satisfactory ones has paid dividends in better labor relations and increased productivity. Hundreds of examples might be picked, but the selection of one will illustrate the industrial progress which has been made.

Tire manufacturing, to cite the example, once had the reputation of being anything but pleasant work. Today, conditions have changed. A modern tire factory is clean, the work flows smooth and few jobs require special physical exertion. Improved methods and machinery have contributed to this condition. Among these improvements the greatest progress in removing drudgery from the job possibly has come from the application of compressed air in many ways to eliminate physical strain on the job.

For the benefit of those who are seeking ways to eliminate drudgery in industry and increase productivity, some of the compressed air applications at the Los Angeles plant of United States Rubber Company are described here. Possibly the best way to do this is to start from the central compressor plant and then trace the air lines to the several points of use.

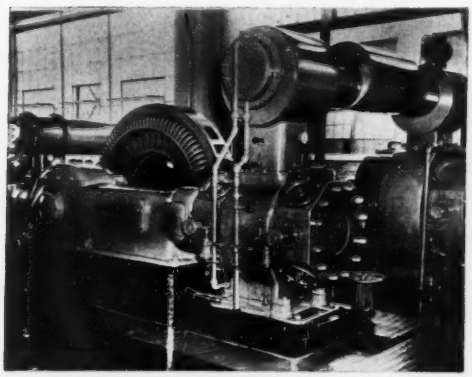


FIG. 1—This 3000 cubic feet per minute, two-stage air compressor is one of six units in the central compressor plant, U. S. Rubber Co., Los Angeles.

FIG. 2—Handling of heavy tires is simplified throughout the plant by the use of air lifts. Here, a piston-type lift is used for raising and lowering tires at the trimmer machine.

The average plant load is 6000 cubic feet per minute at 125 pounds per square inch pressure. This is supplied by six 2-stage, horizontal type compressors (Fig. 1). One is a 2000 cubic feet per minute unit driven by a 400-horsepower motor; the others are a 3000 cubic feet per minute unit driven by a 600-horsepower motor; a 1250 cubic feet per minute unit driven by a 200-horsepower motor; a 1050 cubic feet per minute unit driven by a 200-horsepower motor; a 450 cubic feet per minute unit driven by a 100-horsepower motor and capable of delivering air at 225 pounds per square inch pressure if desired; and a 1250 cubic feet per minute steam-driven compressor. The latter unit helps in maintaining the plant's steam balance. Two 6-inch main lines take this power from the central plant to every part of the tire plant.

Moving on to the points of use for this versatile power, one of the first applications noted is at the big Banbury mixers. A large air cylinder actuating a ram of about 14-inch diameter supplies the positive push-down to the rubber in the mixer. A similar air cylinder actuates the hopper door through which the rubber mix is discharged from the machine.

Continuing through the plant it soon becomes apparent

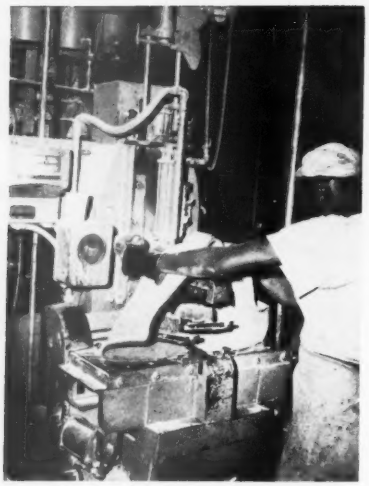


FIG. 3—Tube splicing is fast and requires minimum effort on this machine, which employs compressed air to actuate the slicer and, by means of another air cylinder, to bring the splicers together.

that compressed air is at work at virtually every station and that typical examples, rather than a complete listing of applications, are necessary in order to condense the labor-saving and productivity story.

As tires come out of the curing chamber on a roller conveyor line, a suspended air cylinder supports a hydraulic cylinder whose piston operates two prongs inserted in the side of the heavy metal mold in order to break the two sections apart. There was a time when men labored with cinch bars to pry open such molds.

When the heavy service tire mold is broken, the tire is lifted out by means of an air hoist, which is another effort-saving use for air. The molds are then re-filled and continue along the conveyor line until they automatically trip an air lift which raises the conveyor section to a high point on the continuous conveyor line, from where they move by gravity to the point where a worker lifts them—again with an air lift—into the curing presses.

Air hoists are used throughout the tire plant for many similar operations. U. S. Rubber engineers point out that air-operated lifts are easily and closely controlled, fast acting, have minimum maintenance requirements and are spark-free. The latter advantage is especially important in a tire plant since considerable amounts of solvents are used and dangerous sparks must be avoided. The generous use of these hoists is an important factor in the company's over-all plan of eliminating worker fatigue and maintaining the steady, smooth flow of production.

Compressed air performs many other lifting jobs, but one more example should suffice to illustrate the various ways loads are being taken off workers' backs. The worker at a heavy service tire trimmer (Fig. 2) merely rolls the tire to the trimmer, touches a lever and an air lift raises the heavy tire to trimming position within the framework of the machine, then lowers the tire on completion of the operation. On certain trimming operations, air cylinders also are used to hold the rollers for the take-off.

Actual tire-making operations employ compressed air in several ways. Tire building machines are equipped with air-operated clamps to bring equipment together for setting beads. Raw tires are squeezed into molds, before going to the curing presses, by a powerful air cylinder having a 10-inch stroke and a 24-inch diameter. Tube molds are opened by compressed air action. During the curing operation, compressed air controlled by timers automatically turns steam on and off. The tube splicer employs an air cylinder to actuate the slicer and another air cylinder to bring the electrical splicers together (Fig. 3). In some cases these and other compressed air applications in manufacturing processes are part of improved manufacturing methods and in others they also have served to eliminate manual effort previously required in the manufacturing.

A more direct example of how air has taken backaches out of the tire industry is found in the pulling of curing bags out of tires. After the tire has been placed on a rack the worker attaches a hook to the curing bag. The other end of the hook is connected with the piston of a horizontally positioned air cylinder, which is 48 inches long and of 6-inch diameter (Fig. 4). Then, at the touch of a lever, the curing bag is snapped out of the tire by an irresistible pull. On the large tire line, a vertically positioned air hoist performs the same task.

Getting the curing bag into a tire also is a former difficult job which has been simplified. Pushing rather than pulling is required here, so air-operated pushers are used (Fig. 5). On a heavy service tire, for instance, an air-operated plunger collapses the curing bag and a heavy lid is lowered by air for bagging the tire.

Taking over of rugged manual jobs is not the only assignment for compressed air in tire manufacturing. U. S. Rubber employs air-operated, diaphragm-type valves to control the curing cycle. Sensitive response of the air-operated valves gives the exact control wanted while at the same time reducing both the original and maintenance expenses of a mechanical control system.

Ease of application to a variety of tasks is in fact one of the important reasons why U. S. Rubber uses

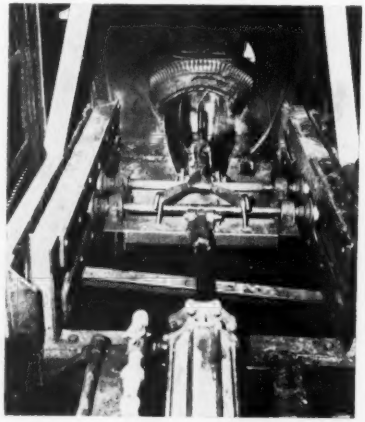


FIG. 4—Curing bags are quickly yanked out of tires by the pull of this air cylinder, lower center, on a hook attached to the bag.

this versatile power in so many different ways. It might be well to mention a few of the other types of applications.

One of the largest uses for compressed air in the plant is for drying and cleaning purposes. Rubber must be completely dry before curing. As it moves along on a continuous line, the tire tread passes through air jets which remove most of the moisture. Then it moves under infra-red lights to complete the drying process. Again, air jets are used for cleaning molds of every particle of dust and moisture and for similar positive cleaning purposes. If it were not for this positive cleaning, there would be excessive scrap, or a less effective cleaning method would slow down the smooth production flow.

Tire manufacturing's dependence on compressed air dictates alert policies in connection with the air system behind the many devices and machines using this power. The company's air compressors are always kept mechanically perfect because it pays off in power savings and also top performance of air-operated equipment. The distribution system is kept up as carefully as the compressor units. For example, there is a continuous inspection system for air line leaks as well as for cleanliness. If oil, water or dirt are found, the lines are blown out. Presence of dirt, however, is checked to a great extent by use of intake filters while aftercoolers and individual aridifiers are used to reduce moisture content.

Each tire manufacturer has worked out his own uses for compressed air, including some applications which might be regarded as production secrets. In the main, however, the applications described at the Los Angeles Plant of the United States Rubber Company are typical of those to be found in other large tire manufacturing plants. This fact explains to a large degree why tire factory jobs have become more attractive, labor turnover has been reduced and many production economies effected in the face of rising costs.

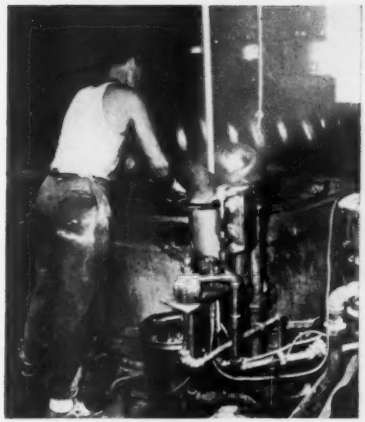


FIG. 5—Pushing a curing bag into a tire is a task which has been simplified by the application of air-operated pushers to collapse the bag.

Reports of Rubber Activities in Various Foreign Countries

ADDITIONAL reports of rubber manufacturing activities in various foreign countries appear below. These reports are furnished by the U. S. Department of Commerce and are secured from miscellaneous sources, including American embassies and consulates abroad.

Peru: Based on sales by the Peruvian Amazon Corporation, the apparent consumption of natural rubber in Peru in 1950 amounted to 1,573,050 kilograms (dry weight) of domestic rubber and 54,459 kilograms (dry weight) of imported rubber, compared with 1,383,018 wet kilograms of domestically produced rubber and 250,984 dry kilograms of foreign rubber in 1949. (Conversion of wet into dry rubber involves a reduction of 20 percent, according to the trade.)

Stocks of natural rubber held by manufacturers at the end of 1950 were roughly estimated at 50,000 kilograms, dry weight, a substantial decline under a calculated 130,000 dry kilograms, at the end of 1949.

An increased demand for tires and tubes in the second half of 1950 more than offset the recession sustained in the first 6 months of the year. Total production was 47,626 tires and 32,231 tubes in the second half of 1950 compared with an output of 29,084 tires and 21,256 tubes in the first half of 1950, or a total for the year of 76,710 tires and 53,487 tubes, a slight increase over the 75,194 tires and 48,255 tubes produced in the preceding year.

Production of other rubber goods by leading manufacturers in most items, including camelback, repair materials, cement, tubing, packing, hose, mats, V-belts, gloves, shoe heels, and small items such as balls, plugs, rings, and stoppers, showed considerable advances over the output of the preceding year.

Belgium: Trade estimates placed production of Belgian automobile tires in the second half of 1950 at 425,000 units and tubes at 295,000 units, compared with an estimated output of 300,000 tires and 290,000 tubes in the first half of the year and approximately the same number in the last half of 1949. The gain in production in the second half of 1950 was attributed to a greater demand in the domestic market and for export.

Estimated production of all other rubber goods in the last 6 months of 1950 was reported to have increased to approximately 12,000 metric tons from about 9,000 tons in the first half of the year and 9,500 tons in the last half of last year.

Production in 1950 was limited by decree to 75 percent of the rated production on April 1, 1939. The Federation of Rubber Manufacturers has requested the Ministry of Economy to limit the production for the remainder of 1951 to 75 percent of total capacity by volume existing on July 4, 1950, the limitation to be retroactive to January 1, 1951.

The demand for rubber goods increased in the second half of 1950, particularly for tires and tubes. It was reported that some dealers had stocked tires to cover themselves against further price increases.

Imports of all kinds of rubber goods in the last half of 1951 are estimated at 6,500 tons compared with 4,235 tons in the first 6 months of the year and 3,662 tons in the last half of 1949.

Estimated imports from the United States in the last 6 months of 1950, mostly tires and tubes, amounted to 1,300 tons. Imports from the United States in the first half of the year were estimated at 805 tons and in the last half of 1949, 980 tons.

Determination of Rubber Hydrocarbon by Measurement of Refractive Index

A SIMPLE, rapid method for the quantitative determination of rubber hydrocarbon in crude natural rubber has been developed by Rachel J. Fanning and Norman Bekkedahl of the National Bureau of Standards, Washington, D. C. As the new method requires only the measurement of the refractive index of a solution containing a known weight of rubber in a known weight of solvent, a single operator can make a large number of separate determinations in a short time. The NBS procedure is thus expected to find application in the rubber industry for the evaluation of crude rubber, especially where the lower grades are used.

Explanation of the Problem

In addition to rubber hydrocarbon, crude natural rubber contains moisture, resins, proteins, ash, and other minor constituents. Although most of the better grades of rubber prepared on plantations contain from 93 to 96 percent rubber hydrocarbon, the lower grades of plantation rubber as well as many types of "wild" rubber may contain much lower percentages—in some cases as little as 70 percent or even less. Because of this great variation in the nonrubber constituents, which can largely be considered as inert material, the hydrocarbon content of natural rubber must be known in order to evaluate it for processing and use.

While several methods have been available for the determination of rubber hydrocarbon, none of them has proved entirely satisfactory. For example, cumulative errors decrease the accuracy of the method of "differences," in which the nonrubber constituents are first determined quantitatively and their total percentage then subtracted from 100. The only two direct procedures currently in use, the chromic acid oxidation method and the rubber bromide method, involve chemical reactions and require empirical correction terms in the calculation of the results from the data. All three of these methods require a large amount of chemical apparatus and extensive manipulation. The new refractive index method, on the other hand, employs no special apparatus other than a refractometer. It makes use only of physical processes and thus involves only measured physical constants and no correction terms.

In the NBS method, a small sample of the crude rubber is first cut into small pieces and weighed. It is next treated with acetone to remove resinous material. After drying in a vacuum oven for about an hour at 100°C., it is again weighed and dissolved in 1-bromonaphthalene. The resulting solution is made complete and uniform by heating with intermittent stirring for two hours at 140°C. After cooling, the solution is weighed, and its refractive index is measured. From the observed data and from the known densities and refractive indices of the pure solvent and the rubber hydrocarbon, the percentage of the rubber hydrocarbon in the sample is computed.

This procedure is based on two assumptions. The first is that all material remaining in the acetone-extracted rubber, with the exception of the rubber hydrocarbon, is insoluble in the bromonaphthalene and consequently has no influence on the refractive index of the solution. The second assumption is that the refractive index of a soluiton of rubber hydrocarbon in a solvent is a linear function of the volume percentage of the rubber hydrocarbon in solution. Both assumptions appear to have been justified by the results of a large number of measurements on various samples of natural rubber, including plantation rubber, purified rubber, and a variety of wild rubbers.

Assuming a straight line would be obtained by plotting refractive index of the solution against the volume percentage of rubber hydrocarbon present in the solution, the ratio of any two differences along one axis can be set equal to the ratio of the corresponding differences along the other axis. Specifically, the ratio of the volume of rubber hydrocarbon to the volume of solvent in the solution can be equated to

$$\frac{n_s - n_M}{n_M - 1.5190}$$

where n_s is the refractive index of the solvent, n_M is the observed refractive index of the rubber-bromonaphthalene solution, and 1.5190* is the refractive index of natural rubber hydrocarbon as recently determined at NBS. The weight percentage of rubber hydrocarbon in the original rubber sample is then obtained from the equation

$$\% \text{ rubber hydrocarbon} = \left\{ \frac{M - E}{D} \right\} \left\{ \frac{n_s - n_M}{n_M - 1.5190} \right\} \left\{ \frac{0.9060}{R} \right\} 100$$

where M is the total weight of extracted rubber and solvent, E is the weight of extracted rubber in the mixture, D is the density of the solvent, R is the weight of the sample of crude rubber before extraction with acetone, and 0.9060 is the known density of the rubber hydrocarbon in grams per cubic centimeter at 25°C.

Evaluation of Present Methods

In studies of the method at the Bureau, samples were analyzed ranging from partially purified rubber having a rubber hydrocarbon content of about 99 percent to some wild rubbers containing only about 80 percent rubber hydrocarbon. In general, the precision of the refractive index method has been found to be about the same as that of the rubber bromide method and somewhat higher than the chromic acid oxidation method. However, an advantage of the chromic acid method over the other two is that it can be applied to either unvulcanized or vulcanized rubber and also to mixtures of natural and synthetic rubbers. This is not true of either the refractive index or the rubber bromide method, both of which are applicable only to unvulcanized natural rubber.

* This value is for the sodium D line at 25°C.

Editorials . . . . . .

Growing Optimism

ALTHOUGH official Washington is warning the rubber industry that it will have to live with controls and regulations for some time to come, there is a growing feeling of optimism in rubber manufacturing circles that the yoke may be lifted in the not-too-distant future. Further, although the industry does not expect the General Services Administration to relinquish its duties as exclusive purchasing agent for natural rubber before the end of the current year, it believes that another reduction in the selling price will be achieved before year-end. The GSA price of natural rubber was reduced from 66 cents to 52 cents a pound as of July 1.

This feeling of optimism in the trade cannot be coupled with the current truce negotiations in Korea. It is not based on let-downs or cut-backs because of these negotiations, but rather on a series of incidents and specific factors. For example, in announcing that the ban on delivery of spare tires to automobile plants will be lifted, DPA Director Manly Fleischmann intimated that lifting of the ban was possible because of improved rubber supply and lower steel allotments which will cut automobile output in the current quarter of the year. The industry believes that the rubber supply picture is so improved that lifting of the ban on the fifth tire is only the first of a series of orders which will permit a gradual easing of controls.

The mounting rate of synthetic rubber production is another factor contributing to the optimism. Production of GR-S in the month of January, 1951, amounted to 48,000 long tons, an annual rate of 576,000 tons. June production was 61,000 tons, an annual rate of 732,000 tons. Production in December is scheduled to reach 72,000 tons, an annual rate of 864,000 tons. In addition, it is known that plans are afoot for the construction of new facilities for the production of an additional 100,000 tons of GR-S per year, as well as for another Butyl rubber plant. These plans are not expected to be put into operation in the immediate future, but will be held in abeyance pending future supply-and-demand developments.

Still another factor is the continuing high level of natural rubber production. Production in the first quarter of the current year amounted to 470,000 long tons as compared with 372,000 tons in the first three months of 1950. Production in April of this year amounted to 172,500 long tons as compared with 142,500 tons in April, 1950. The figures are those issued by the Secretariat of the Rubber Study Group. While the recent high level of production can be partly attributed to the high price of rubber for the past six months, it is not expected to drop off too sharply as a result of current market conditions.

Classified Rubbers

A CONCERTED effort is currently being made by natural rubber producers, through the services of the International Rubber Research Board, to enable American rubber manufacturers to evaluate and determine for themselves the advantages of technically classified natural rubber. This movement, which has long been building up, is intended to give the consumer an improved material without premium cost. It merits a full trial and all rubber manufacturers, particularly the smaller and medium-sized concerns, are urged to give it a fair test. It is to their own ultimate advantage.

Some confusion still exists with regard to these rubbers, which were formerly called Specification Rubbers. Particularly are they confused with the specialty rubbers, to which one or more special ingredients are added at the plantation stage to give them some one or more special properties, and which are generally sold at a premium price. Technically Classified Natural Rubbers are nothing more or less than those rubbers for which the normal market classification is supplemented by additional information, obtained from tests carried out on the freshly-prepared rubber. The rubber so classified is identifiable by special marks on the bales—lines, circles and/or crosses in various colors. The full meaning of these marks and colors has been outlined in this and other rubber journals.

For the time being, these rubbers are classified on the basis of their modulus and Mooney values, the modulus being indicated by the *color* of the mark on the bales and the Mooney by the *shape* of the mark. There is general agreement that the classification based on the modulus test has been vindicated. There are some complications, however, with regard to classification on the basis of the Mooney test, particularly because of the hardening of the rubber on storage. According to Dr. R. G. Newton, who is coordinating officer for the International Rubber Research Board, the rubber producers are keeping an open mind on preferable methods of classification, and invite suggestions from American rubber manufacturers on this score.

Although only some 4,000 tons of technically classified natural rubber were produced in 1950, approximately 20,000 tons will be produced this year, about half in Malaya and half in French Indo-China. About 4,000 tons will be imported by the United States, and arrangements have been made with the General Services Administration to keep this rubber out of the stockpile. Manufacturers who desire volume scale quantities of this rubber for evaluation should write to W. J. Sears, Vice-President, Rubber Manufacturers Association, 1832 M St., N.W., Washington, D. C. Remember, it will be to your own advantage to do so.

CURRENT NEWS OF THE MONTH

GSA CUTS PRICE OF NATURAL RUBBER TO 52C AS RFC EXTENDS 30-DAY CREDIT ON SYNTHETIC

TWO actions of major importance to the domestic rubber manufacturing industry have been taken by the government in recent weeks. On June 21 the General Services Administration announced that the price of natural rubber sold to the industry would be dropped to 52 cents a pound as of July 1. On June 25 the RFC Office of Rubber Reserve announced that effective with permits issued for July shipment its policy was being amended to provide 30 days credit to all purchasers allocated synthetic rubber by the National Production Authority, limited as to amount only by credit lines approved by the treasurer of the Reconstruction Finance Corporation. Credit will be available to agents guaranteeing the accounts of purchasers allocated synthetic rubber by NPA under conditions to be established by RFC.

Reduction in the GSA selling price of natural rubber came as no surprise to the industry, since it has been known for some time that GSA, which is charged with all U. S. purchases of rubber in the world market, has been buying its rubber for around 50 cents a pound in recent months. The only question was in the size of the reduction. GSA has been selling natural rubber to the industry for 66 cents a pound since last December, when it undertook the exclusive buying program. Announcement of the new 52 cent price was made after consultation with the Office of Price Stabilization.

Substantial Savings Visualized

In making the announcement of the price reduction, Jess Larson, GSA Administrator, said that the new price will prevail for a period of at least 90 days, and was being made effective as of July 1, "so that all members of industry can secure the benefit at the same time." He estimated that industry will realize an initial savings of nearly $40,000,000 in the next three months because of the action.

According to Michael V. DiSalle, Director of Price Stabilization, in a statement also issued on June 21, if Congress permits rollbacks where they are economically justified, the decrease in the price of natural rubber could mean up to $200,000,000 in savings annually to the consumer and the taxpayer. He also indicated that the decrease will be reflected in lower ceiling prices in the rubber industry during the second half of the current year.

The first price effect of the GSA action in reducing the price of natural rubber was the abandonment of certain price increases to which industry would have been entitled under the pricing formulas of the Manufacturers' General Ceiling Price Regulation, CPR 22, the effective date of which was to have been July 2. These formulas permit manufacturers to add to their base period prices material and labor cost increases up to certain cut-off dates.

For example, the Tire and Tube Industry Advisory Committee at a meeting with OPS officials on June 21 agreed that their industry would waive an approximate 5% increase in the ceiling prices on tires and tubes to which it would have been entitled under CPR 22. The potential increases amounted to 4.1% on replacement tires and tubes and 5.95% on original equipment.

The Advisory Committee agreed that the tire and tube industry was willing to continue pricing under the GCPR freeze of January 26, 1951, pending the completion of a tailored regulation for their industry and determination of the effect of the reduced rubber price. Subsequently, OPS issued Supplementary Regulation 10 to CPR 22 denying the tire industry pending price increases. Actually, as outlined elsewhere in this issue, the supplementary regulation only "postpones" the previously-approved price increases on tires and tubes until cost factors are recalculated.

Also as outlined elsewhere in this issue, other industry advisory committees have waived potential increases of up to 7% under CPR 22, including footwear, heels and soles, rubber hose, and some drug sundries. Decreases under GCPR prices in such items as rubber bands, thread, V-belts and friction tape, will result because of the GSA action in reducing the price of natural rubber.

Details on Synthetic Credit

The action of the RFC Office of Rubber Reserve in extending credit terms to purchasers of synthetic rubber followed a meeting between RFC Administrator W. Stuart Symington and the recently-appointed RFC nine-man rubber industry advisory group.

The advisory group pointed out that many manufacturers, particularly the smaller manufacturers, found their operations strained by advance payment for rubber which often is weeks late in delivery. Delays have frequently occurred in delivery because the government's stocks of synthetic rubber were cut below efficient operating levels by the high demand for rubber.

According to the new RFC credit policy, all credit lines approved prior to January 1, 1951, have been re-established on the corporation's records and purchase permits issued for July and subsequent shipment will be appropriately stamped as approved for 30 days credit in accordance with such approvals.

Purchasers desiring to establish approved credit lines should file application on RFC Form 371 with the Treasurer of the Reconstruction Finance Corporation, 811 Vermont Avenue, N. W., Washington 25, D. C. RFC Form 371 is available in the office of the Treasurer and will be forwarded on request. Each credit line approved will be for a maximum amount which may be outstanding at any one time and will remain effective until further notice, but in no event for more than one year.

With respect to purchase permits stamped approved for 30 days credit, payment of the purchase price will not be required to accompany the shipping instructions but will be due 30 days from the date of shipment, as indicated on invoices rendered. As the records of individual shipments will be maintained by the Distributing Agents making the shipments, it is essential that remittances in payment of the accounts be made payable to the Reconstruction Finance Corporation and be forwarded direct to the Distributing Agent making the shipment so as to be in the hands of such agent on or before the due date.

Claims for quality, packaging and weight adjustments must be handled as separate transactions in accordance with presently existing procedure and may not be deducted at the time invoices are paid.

Considering Third Butyl Plant

The Munitions Board has asked the Office of Rubber Reserve to submit designs and plans for a new 40,000 long ton butyl rubber plant incorporating latest process improvements. When this has been accomplished, the Munitions Board will decide whether the proposed plant is required for national defense needs. The location of the plant will be based upon an economic survey. A determining factor for plant location will be the availability of isobutylene.

Borger, Texas, is regarded as a likely site for the plant, with the Phillips Petroleum Co. as the operator. If the new plant is constructed it will be the first domestic butyl rubber plant to be operated apart from the Esso Standard Oil Co. Esso operates a 38,000 ton plant at Baton Rouge, La., while the Humble Oil Co., an Esso affiliate, operates another Butyl plant at Baytown, Texas, which has a demonstrated capacity of 40,000 tons a year.

According to an announcement by the B. F. Goodrich Chemical Co. early last month, reopening of the government-owned copolymer plant at Institute, West Va., the world's largest synthetic rubber plant, has been completed. All production lines at the plant are now operating slightly above their rated capacity of 90,000 long tons annually. The Institute facility had been in standby capacity since 1947.

The prospect of bringing more companies into the operation of the government-owned synthetic rubber plants was recently reviewed by RFC officials and the special RFC rubber industry advisory committee, but no decisions were reached. It is known, however, that plans calling for participation by still more of the smaller companies in the field are under consideration.

The RFC rubber industry advisory committee, which was appointed about two months ago and which includes representatives of most of the larger rubber manufacturers, does not include a representative of the General Tire & Rubber Co., the nation's fifth largest rubber concern. Recently questioned on this omission, RFC Administrator Symington stated that he thought it "unwise" to appoint a General Tire representative on the committee because of that company's firm views "that RFC should pay many millions of dollars" for its new synthetic rubber process.

Of special interest in the over-all synthetic rubber picture was the announcement that Shell Oil Co. has let contracts for the construction of a new multi-million dollar plant at Houston, Texas, for the production of benzene and gasoline. Benzene capacity at the new plant will be 19,000,000 gallons a year. Benzene, now in critically short supply, is urgently needed for the expanding synthetic rubber production.

Limit Rayon Use in Rubber

In order to prevent increased use of high tenacity rayon in the production of rubber products for non-defense purposes, NPA amended Order M-2 on July 1. The amendment limits the use of this type rayon in the manufacture of non-defense rubber products during the third quarter of 1951 and subsequent quarters by any person to the average quarterly use by weight of such material during the first half of 1951. The amendment also prohibits the ordering of more high tenacity rayon than the quantity permitted for use during a given quarter.

Other official actions by Washington of direct interest to the rubber manufacturing field included the following:

On June 2 NPA ordered sulfur suppliers to ship sulfur only when authorized by NPA and limited sulfur users to 100% of the 1950 rate of consumption. Controls are vested in Order M-69.

Allocation of sebacic acid was ordered by NPA, effective July 1. The material will be allocated as an Appendix B material under Order M-45, requiring suppliers to secure NPA authorization before filling orders.

Other Allocation Regulations

Methyl chloride has also fallen under allocation regulations, again as an Appendix B material under Order M-45. Approximately 75% of the production of this material, estimated at 1,500,000 pounds a month, is used in the manufacture of synthetic rubber.

NPA announced on June 12 that allocation of carbon tetrachloride can be expected in the near future. However, no allocation of carbon bisulfide, used in the manufacture of carbon tetrachloride, is planned.

"Unsinkable" Bathing Costume

A German firm has come up with the very latest in beachwear, an "unsinkable" bathing costume. The unique garment, normal in appearance, has thin strips of foam rubber sewn into its material. The makers claim it enables non-swimmers to stay afloat and is especially valuable for children learning to swim.

New Use for Magnus D-Scale-R

A maker of rubber footwear recently reported to the Magnus Chemical Co., Garwood, N. J., a new use for their D-Scale-R, the inhibited acid cleaner which can be safely used on metals. This particular plant uses large numbers of aluminum molds for footwear, and these become coated with latex and coloring matter. Many different cleaning methods were tried, including the use of nitric acid. Now, however, the molds are dipped in a solution of D-Scale-R in a stainless tank, at about 140° F., after every molding cycle. The molds remain in the solution for about two minutes and are then rinsed and ready for use. The cost of the mold cleaning operation has been reduced by at least 80%, Magnus states, and the molds are clean all the time.

G-E Continuous Sampling Unit

To aid quality control engineers in continuous sampling, the Special Products Division of the General Electric Co., Schenectady, N. Y., has announced the development of a "continuous sampling monitor," an electrical device which automatically keeps track of the sampling procedure. Developed by the company's General Engineering Laboratory for use in the G-E Refrigerator Division, the monitor was designed to eliminate the complexity of paperwork inherent in the continuous sampling methods of quality control.

SYMPOSIUM ON ABRASION-WEAR PLANNED BY RUBBER-STICHTING

Rubber-Stichting, Delft, Holland, has arranged for an International Symposium on Abrasion and Wear which will be held in conjunction with the opening of its new facilities in Delft on November 14 and 15. Scientists from the United States, Holland, Great Britain and other countries will present papers. In conjunction with the symposium, apparatus for measuring wear and abrasion will be exhibited.

Persons interested in participating in the symposium are requested to address Dr. H.C.J. de Decker, Secretary, Rubber-Stichting, Postbox 66, Delft, Holland. The following scientists are scheduled to deliver papers at the symposium:

Dr. F. P. Bowden, Reader in Physical Chemistry, Cambridge University, England.

Ir. H. Blok, Research Chemist, Royal Dutch Shell Laboratory, Thornton, Cheshire, England.

Prof. Ir. J. J. Broeze, Director of Research, Royal Dutch Shell Laboratory, Delft, Holland.

Dr. Ing. G. Salomon, Scientific Advisor to T.N.O. and Rubber-Stichting, Delft, Holland.

J. M. Buist, Research Physicist, Rubber Service Laboratory, I.C.I., Manchester, England.

Dr. A. Schallamach, Research Physicist, B.R.P.R.A., Welwyn Garden City, Herts., England.

Dr. N. A. Brunt, Research Chemist, Paint Institute, T. N. O., Delft, Holland.

Dr. R. D. Stiehler, Chief, Testing and Specifications Section, National Bureau of Standards, Washington, D. C.

Dr. H.C.J. de Decker, Director of Research, Rubber-Stichting, Delft, Holland.

Found Guilty of Monopoly

Five Standard Oil Companies and the Atlas Supply Co. have been found guilty by a government trial examiner of monopolistic practices in tire, battery and auto accessory sales. Unless the decision is appealed, or the Federal Trade Commission starts a review of the case, the decision becomes final within 30 days from the date originally handed down. Basis of the complaint was a charge that the companies used their vast purchasing power to force manufacturers to give them lower prices or discounts and rebates denied competitors. The trial examiner's decision was accompanied by a "stop-it" provision to go into effect one year after the issuance of the commission order. Affected were the Standard Oil Companies of New Jersey, Kentucky, California, Ohio and Indiana, and the Atlas Supply Co. of Newark, N. J. Atlas serves as buying agent for accessory products Standard companies sell through service stations.

U. S. Rubber has opened a new office in the New Center Building in Detroit, Mich., to house automotive sales personnel who handle original equipment sales of certain rubber products to the auto industry.

OPS ISSUES NEW PRICE REGULATIONS FOR THE RUBBER INDUSTRY

The Government has issued two new regulations which set cost adjustment factors for some parts of the rubber industry and exclude other parts from control under the manufacturers' ceiling Price Regulation. The Office of Price Stabilization announced price adjustments for manufacturers of such rubber goods as overshoes, heels and soles, rubber bands and erasers, rubber gloves and bathing caps. Effective July 2, Regulation 8 to C.P.R. 22 fixes industry-wide adjustment factors for these products.

The O.P.S. said ceilings under the new regulation—except for rubber erasers—will be no higher than ceilings under the General Ceiling Price Regulation. In a number of instances, the new ceilings will reflect the recent reduction in the Government's selling price of crude rubber from 66 to 52 cents a pound.

The price agency said manufacturers of several categories of rubber products previously had waived price increases ranging up to several percentage points over G.C.P.R. prices that they would have been entitled to under C.P.R. 22, effective July 2. They refrained from ordering raises because of the lower price for natural rubber, and they eventually would have had to recalculate new ceilings for their products under C.P.R. 22, O.P.S. officials noted.

Determining Ceiling Price

To determine his new ceiling price for each item covered by Supplementary Regulation 8, a manufacturer must multiply his own base period price by a factor common to the entire industry. The base period to be used varies from item to item. O.P.S. said it developed the industry-wide factors for each item from weighted averages of data submitted by individual manufacturers.

The effect of applying the factor on some items will leave general ceiling prices unchanged. In these cases, the factor supplied by O.P.S. to the industry works out to be 1.00. Price advances for these products since pre-Korea are on the average in proportion to increased costs, O.P.S. said.

Ceiling prices will be increased over General Ceiling Price Regulation levels for rubber erasers, O.P.S. said, because eraser prices under the G.C.P.R. are about the same as their pre-Korean prices in spite of higher costs. Rubber bands, on the other hand, will be rolled back about 11% from G.C.P.R. prices. O.P.S. said the advance in prices for rubber bands exceeded the rise in cost.

O.P.S. indicated that the supplementary rubber price regulation is written so that additional factors for other products can be added as soon as they are computed from cost data furnished the agency by the industry. O.P.S. said factors probably will be announced shortly for hose, belting, sponge and foam rubber products, adhesive and friction tape, rubber thread, tiling and certain other mechanical rubber goods.

In its other regulation, designated Supplementary Regulation 10 to C.P.R. 22, Government price fixers excluded certain automobile tires and tubes from coverage by C.P.R. 22 and left them temporarily subject to the general price freeze. The regulation, effective July 2, also permits manufacturers of certain molded, extruded and cut mechanical rubber goods the option to continue to price items under the G.C.P.R. if their sales amounted to less than $10,000 in the second quarter of this year.

O.P.S. said the exclusion of tires and tubes from C.P.R. 22 is in conformity with recommendations from the industry. Although they would be entitled to price increases of almost 6% on some of their products, O.P.S. said the tire and tube manufacturers preferred to maintain G.C.P.R. prices, rather than receive the price increases for their products and later recompute them because of the lower rubber price.

The tire and tube industry will remain under coverage of G.C.P.R. only for a short while, however, O.P.S. indicated it is presently completing a tailored regulation for the industry.

O.P.S. said that replacement tire and tube prices would roll forward 4.18 per cent on the average, and original equipment tires and tubes 5.95 per cent, if they were priced under the manufacturers' regulation.

"Anticipating that a substantial cut in the price of rubber sold by the Government would be reflected in future calculations of ceilings under the manufacturers' formulas, the tire and tube industry advisory committee said it was willing to waive these temporary price increases and remain under the "freeze" of Jan. 26 pending completion of a tailored or supplementary regulation for that industry.

Ceiling Prices for Scrap

Ceiling prices on scrap rubber will be rolled back only slightly under a dollars-and-cents regulation now being readied by O.P.S. Officials said they expect to issue the order in the near future, possibly with a companion order setting ceilings on reclaimed rubber made from scrap. The rollback is being kept small deliberately so as not to discourage the collection of scrap for reclaimers. They are expanding to meet demands which cannot be filled by synthetics or natural rubber.

Clopay EDF Crystals Available

Clopay Corp., Cincinnati, Ohio, has announced the availability of the crystalline condensation product of ethylene diamine and formaldehyde, commonly known as EDF crystals. The EDF compound corresponds very closely to one described by Bischoff (*Ber.* Vol. 31, p. 3524), and current experimental production is in the form of white crystals having a melting point of 186° to 189° C. The product is extremely useful as a high-speed setting agent for phenolic type resins and adhesives and should be of interest in conjunction with natural and synthetic rubbers as well, the company states.

Stabelan G-1 Paste Stabilizer

A new paste stabilizer, known as Stabelan G-1, has been developed by the Stabelan Chemical Co., Toledo, Ohio, and is now being released to the market by the Harwick Standard Chemical Co. of Akron, Ohio. The new product is recommended as a stabilizer for organosol and plastisol dispersions. It is said to help achieve perfect cast films and is an excellent stabilizer for extruded or injection molded products as well as for monofilaments made of vinyl or vinylidine chloride. Stabelan G-1 is said to impart excellent heat stability and to prevent discoloration of polyvinyl chloride resins during fluxing or fusion at very high temperatures. Many industrial runs have shown that the processing of these resins at temperatures up to 340 to 350° F. is feasible in the production of clear or pigmented films either on the calender or cast from dispersions. Laboratory tests have also indicated that Stabelan G-1 paste appreciably retards the breakdown of polyvinyls under prolonged heat aging. The paste also provides excellent stabilizing action against ultraviolet light.

More Certificates of Necessity

The Defense Production Administration has issued a number of additional Certificates of Necessity providing for accelerated tax amortization on new defense facilities. Certificates issued recently include:

Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, Ohio, $1,841,102 for wire and textile braiding operations.

Athens Machine Co., Athens, Ohio, $57,500 for tire molds.

Goodyear Tire & Rubber Co., Gadsden, Ala., $151,341 for reclaimed rubber.

General Atlas Carbon Co., Pampa, Texas, $152,181 for carbon black.

Paramount Rubber Co., Detroit, Mich., $100,000 for rubber parts.

Goodyear Tire & Rubber Co., Akron, Ohio, $464,123 for processing scrap rubber.

Gates Rubber Co., Denver, Colo., $483,883 for rubber hose and belting.

Pequanoc Rubber Co., Butler, N. J., $216,522 for reclaimed rubber.

Glen Tells House of Ouster

In an appearance before a House Judiciary Subcommittee studying the monopoly aspects of the mobilization program, Earl W. Glen, former head of the government's rubber program, hinted that his dismissal might have been tied closely to alleged domination of the rubber industry by the four biggest companies. Mr. Glen testified under subpoena. His dismissal was totally unexpected, Mr. Glen said. His relations with all parts of the rubber industry had been the best, or so he thought. He had heard no criticisms from his superiors, he testified. Without elaboration, the witness stated that some parts of the present allocation method promote monopoly in the rubber industry. He thought the present plan favors in some respects the four largest companies.

ASME RUBBER-PLASTICS DIVISION HOLDS ITS SEMI-ANNUAL MEETING

The semi-annual meeting of the Rubber and Plastics Division of the American Society of Mechanical Engineers was held on June 14 at the Royal York Hotel in Toronto, Ontario, Canada, in conjunction with the regular meeting of the parent society. Approximately 60 members and guests were in attendance.

As usual, the Division held two technical sessions, one devoted to rubber and the other to plastics, with three technical papers given at each of the sessions. Dr. Norman A. Grace, of the Dunlop Tire & Rubber Goods Co., Ltd., acted as chairman of the rubber session, with J. I. G. Bell, of Canadian Industries, Ltd., as vice-chairman. At the plastics session, J. B. Farrell, of Farrell Plastics, Ltd., was chairman, and Ralph M. Ferguson, of R. M. Ferguson & Co., vice-chairman.

Papers at Rubber Session

The first paper at the rubber session was "The Engineering Properties of Silicone Rubber," presented by P. C. Servais of the Silastic Section, Dow Corning Corp., Midland, Mich. Mr. Servais presented the physical properties of typical test samples of various Silastic stocks as measured at temperatures ranging from —100° to 500° F. Hardness, tensile strength, ultimate elongation and compression set were plotted against temperature and against time of aging at various temperatures.

A paper on "Synthetic Elastomers for Use at Low Temperatures," by S. C. Einhorn and N. R. Legge, of the Polymer Corp., Sarnia, Ontario, was presented by Mr. Einhorn. As indicated by the title, Mr. Einhorn discussed some of the specialty polymers developed for low temperature use, this subject being of growing importance due to the recent increased use of elastomers as machine members. The background and techniques of tests at low temperature were described and discussed.

The concluding paper at this session was "Neoprene Applications in Engineering Design," prepared and presented by R. W. Malcolmson, Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Mr. Malcolmson pointed out that because there are so many different neoprene compositions commercially available, it is sometimes difficult for the engineer to determine exactly what combination of properties is basic and specific to neoprene. Accordingly, he discussed some of the principal properties of neoprene compositions and described some of their engineering applications.

Papers at Plastics Session

At the plastics session, a paper on "Electric Control of Air Flow Porosity in Plastic Sheet Materials" was presented by Jerome J. Suran of John W. Meaker & Co., New York, N. Y. Emphasizing the fact that porosity in sheet materials is often a critical factor in practical applications, Mr. Suran described the electroventing method developed by his company. This is a method of passing electric sparks through sheet materials, such as rubber and plastics, for the purpose of creating holes to allow the materials to "breathe." According to the speaker, the method was first utilized in connection with paper bags.

"Effect of Orientation on the Mechanical Properties of Polystyrene" was the title of a paper prepared by Albert G. H. Dietz and Robert G. Cheatham, of the Massachusetts Institute of Technology, Cambridge, Mass. Presented by Dr. Dietz, the paper covered an investigation in which extruded rods of polystyrene were annealed in an oil bath and the mechanical properties determined at various rates of load application and various rates of straining or deflection. Among the properties determined were tension, torsion, flexure and compression. Creep and relaxation measurements were also made.

The final paper was that on "The Effect of Absorbed Water on the Physical Properties of Phenolic Plastics" by H. M. Quackenbos, Jr., of the Bakelite Div., Union Carbide & Carbon Corp., Bound Brook, N. J., and J. M. Hill of the Harvard Graduate School of Business Administration, Cambridge, Mass. According to the paper, the absorption of water by phenolic plastics obeys Fick's law and can be described completely by a saturation constant, a diffusion constant and a simple relation between diffusion constant and temperature. Two important consequences of water absorption, the paper indicated, are that mechanical properties change and all dimensions expand.

Business Session Held

A combined meeting of the Executive, Advisory and General Committees of the Division was held during the day. Robert G. Seaman, editor of the *India Rubber World*, was elected a member of the Executive Committee for a five-year term.

Although the parent society is planning to hold four meetings during 1952, it was decided that the Rubber and Plastics Division will participate in only two of these meetings, namely, the Fall Meeting, which will be held in Chicago the week of September 8, and the Annual Meeting, which will be held in New York City the week of November 30.

The next meeting of the Division will be held during the 1951 Annual Meeting of the parent society at Atlantic City, N. J., the week of November 25.

IMPORTANT SHIFTS ANNOUNCED IN SEIBERLING PRODUCTION PERSONNEL

A. L. McMullen

J. E. Kallgren

Important shifts in the production staff of the Seiberling Rubber Co. were recently announced following the resignation of Leo F. Pettitt as general production superintendent. John E. Kallgren has been named to the newly-created position of plant manager, and Alvin L. McMullen has been named production superintendent. In the reorganization, Mr. Kallgren, who had been chief engineer, will be in charge of all production and engineering at the company's domestic plants. Mr. McMullen will be in direct charge of production at the Barberton, Ohio, plant. Edmund G. Balzano continues as Barberton plant engineer, and Edwin P. Schrank has been named chief staff engineer, responsible for design engineering and new and special engineering projects for the Seiberling company.

Both Mr. Kallgren and Mr. McMullen are graduates of the University of Akron, Mr. Kallgren with a degree in mechanical engineering and Mr. McMullen with a degree in chemistry. A native of Grant Park, Ill., Mr. Kallgren attended Ohio Wesleyan University and then came to Akron. He has worked on the engineering staffs of U. S. Rubber and Firestone, and joined Seiberling in 1946. Mr. McMullen was born in Akron, and joined Seiberling after graduating from college in 1939. He was named foreman of the Calendering and Tubing Departments in 1949, and later also took charge of the accessories and repair materials, milling, and cement mixing operations. Mr. Balzano, a graduate of Case Institute of Technology, was named plant engineer last year after service as master mechanic with the company.

GENERAL TIRE FURNISHES DATA ON ITS OIL-EXTENDED RUBBER

Comprehensive data concerning the new oil-extended synthetic polymer developed by the General Tire & Rubber Co. in its own research laboratories was revealed on June 15 in a two-fold manner, the first the presentation of a technical paper at a meeting of the Rubber Chemistry Division of the Chemical Institute of Canada at Kitchener, Ontario, as reported elsewhere in this issue, and the second in the form of a company statement.

The polymer in question is the one which was offered by General Tire to the Reconstruction Finance Corporation several months ago for a cash consideration and which has since been the subject of pro-and-con arguments. Failing to reach a decision with RFC, General Tire turned the polymer over to the Polymer Corportion, Ltd., at Sarnia, Ontario, Canada, for production, as previously reported in this journal, and the material has recently been made available to the Canadian rubber industry by the Polymer Corporation as Polysar Krynol.

According to the General Tire statement, the key to the new process is the utilization of extremely tough synthetic rubbers in conjunction with petroleum oils that cost less than 2 cents a pound. Tire tread rubbers based on two-thirds or less tough synthetic rubber and one-third or more petroleum oil have been used successfully in the production of tires that have out-worn tires made from natural rubber or ordinary cold synthetic rubber.

Company Issues Statement

The story of what the process means is summed up in the company's statement as follows: One compound, based on the General Tire process, as compared with standard synthetic rubber, gives 32% more tires, these tires wear 18% longer, and are produced at a 31% lower rubber cost. The statement also indicated that proven evidence is on hand indicating that these figures can be improved upon in the future.

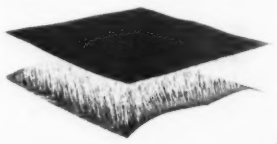
According to the statement, General Tire decided to disclose its process for four reasons, as follows: (1) To get it out of politics; (2) To clarify the subject as to just what the process is, and to correct misconceptions; (3) Because of its significance as it relates to the world's rubber economy; (4) The product is now widely accepted and distributed in Canada.

The statement also charged that it was not until General Tire disclosed in a November 7, 1950, letter to W. Elmer Harber, then RFC chairman, that it had a low-cost method of making extremely high-quality rubber that the RFC displayed any interest. Some time after the negotiations with General Tire had begun, according to the statement, RFC announced a similar development, and "it is significant that there was no suggestion from RFC that such a development was under way until after the negotiations with General Tire had been initiated."

More than 1,000,000 miles of road tests have already been made with tires made from the new type polymer, the company states, and the softened rubber is reported to have marked superiority over all rubbers for wear, for non-skid qualities, and for resistance to cracking and chipping. The tough synthetic rubber can be produced at approximately the same cost as standard GR-S, with this rubber blended with the inexpensive petroleum oil softeners.

Goodyear Maintenance Shelter

Development of a lightweight, inflatable jet pod maintenance shelter for the Air Materiel Command of the U. S. Air Force has been announced by the Goodyear Tire & Rubber Co. Built in two sections and mounted on mated dollies for maneuverability, the portable shelter fits around the jet pedestals under the B-47 bomber wings,



completely enclosing the suspended pod in a weatherproof structure 27 feet long 14 feet high, and 14 feet, 8 inches wide. Material used in the "air mat" construction of the shelter is a two-ply nylon fabric coated with synthetic rubber. The plies, (as shown above) are separated by two to three-inch dropped pile threads which serve as control spacers and contribute to the rigidity of the structure when inflated with only 10 pounds of air pressure. The dead air space between the two layers of cloth acts as insulation. Both shelter and dolly are designed for compact packaging for air shipment and may be speedily assembled.

CMRA Holds New York Meeting

The Chemical Market Research Association meeting held at the Roosevelt Hotel in New York, N. Y., on June 7, featured as its theme, "Rubber and Rubber Chemicals." Three interesting technical papers were presented at the afternoon session. The papers and authors were: "Commercial Synthetic Rubbers" by H. R. Thies, manager of the Chemical Division of the Goodyear Tire & Rubber Co.; "Process Chemicals," by Dr. B. S. Garvey, Jr., director of the Sales Service Laboratory of Sharples Chemicals, Inc., and "Specialized Types and Applications," by Dr. W. F. Tuley, technical director, Reclaim and Paracril, Naugatuck Chemical Division, U. S. Rubber Co. Dr. Frank K. Schoenfeld, technical vice-president of the B. F. Goodrich Chemical Co., acted as moderator for the afternoon session. After a social hour and dinner, Dr. Norman A. Shepard, chemical director of the American Cyanamid Co., introduced the speaker of the evening, Everett G. Holt, special assistant to the Director of the Rubber Division of the National Production Authority.

SCRAP RUBBER INSTITUTE ISSUES BREAKDOWN OF SCRAP INNER TUBES

The Scrap Rubber Institute, one of the component groups of the National Association of Waste Material Dealers, Inc., has issued a breakdown of the various types of inner tubes so that scrap rubber dealers will be able to readily differentiate one from the other. The list follows:

Rubber Tubes (Standard Types): These are natural rubber, and may be either red, grey or black. They have no identifying marks.

GR-S Synthetic: These normally have a red line running lengthwise around the tube.

GR-I or Butyl Synthetic: These normally have a blue line running lengthwise around the tube.

Neoprene Tubes: These synthetic tubes are very often red, although they also come in black. They have a yellow line around the tube.

Lifeguard and Similar Type: This tube has a rubber exterior, but has an inside tube that is made of fabric and rubber combination and is of much less value than regular rubber tubes. Some tubes of this type are made of GR-S.

Puncture-Seal Tubes: These have a regular rubber exterior and have a soft sealing compound on the inside.

As to the packing of tubes, the Institute advises that in loading tubes in cars with tires, it is advisable to pack them in bales, bags or bundles. This will prevent loss in transit and at mills. It would help if dealers would place a tag with their name on each package, thereby identifying all packages and insuring proper deliveries at mills.

The Institute also stated that for mixed inner tubes, the full contract price for this classification is payable only for natural inner tubes of the first classification. All other grades are of lesser value.

M-6 Coal Tar Emulsion

Pioneer Latex & Chemical Co., Middlesex, N. J., has introduced a newly-developed protective coating designed to fill the need for a single product which will give all-around plant protection from corrosive fumes and weather. Composed of coal tar pitch and mineral colloid in a stable emulsion with water, "M-6 Coal Tar Emulsion," as the new coating is called, may be applied with brush, spray or squeegee. The product may be thinned with cold water and two coats are recommended for best coverage. It takes one to two hours to dry and may be applied to iron, steel and other metals, well-bonded compatible old paint, concrete, cinder block, brick and other masonry, insulation. M-6 Coal Tar Emulsion has temperature limits of —50° to 200° F. continuously, and 500° F. flash temperature with dry heat.

Norton Co., Worcester, Mass., has announced an expansion plan costing $6,000,000 which will increase the firm's capacity to make grinding and lapping machines. The new plant will consist of a 740 by 300 foot factory joining a 360 by 100 foot office building.

TENTATIVE RUBBER TEST METHODS APPROVED BY STANDARDS GROUP

The Administrative Committee on Standards of the American Society for Testing Materials recently approved several new tentative specifications, tentative revisions of existing test methods, and new tentative methods of test. Those applying to rubber, as submitted by Committee D-11 on Rubber and Rubberlike Materials, included the following:

A new tentative method of test for compressibility and recovery of gasket material (D-1147-51-T) has been approved. This method is not intended as a test for compressibility under prolonged stress application, nor in fact for tests at other than room temperature. The method pertains only to the determination of the short-time compressibility and recovery at room temperature of sheet gasketing materials and in certain cases gaskets cut from these. It is stated that the specimen to be tested shall have at least an area of 1 square inch and shall consist of a single ply or a number of superimposed plies sufficient to give a minimum thickness of 1/16-inch for all materials except cork compositions and rubber compositions containing cork, for which the minimum thickness shall be 5/8-inch.

By another new tentative test the discoloration of vulcanized rubber covered with an organic finish can be evaluated (D-1148-51-T). The change in color of the rubber is caused through heat and sunlight and the method is established to provide conditions for producing and evaluating this discoloration.

Ozone cracking of rubber under strain when exposed to weather as in automotive uses has been very difficult to evaluate. This is the basis for a new tentative method of test—the accelerated ozone cracking of vulcanized rubber, (D-1149-51-T)—applicable to the vulcanized rubber materials when exposed under tension, to air containing a definite, low volume of ozone. It is pointed out that this method cannot be expected to correlate wholly with outdoor exposure tests since in the latter tests the effects of light catalyzed oxidation and leaching by water are present, in addition to the variations in temperature of exposure as well as different volume of ozone.

Other Approved Revisions

A number of proposed revisions of tentative methods of testing have also been approved. These pertain to a number of subjects and are more specifically concerned with the following: flat rubber belting (C-378-50-T); rubber hose containing woven wire reinforcement (C-380-50-T); dynamic testing for ply separation and cracking of rubber products (D-430-49-T); changes in properties of rubber and rubberlike materials in liquid (D-471-49-T); automotive hydraulic brake hose (D-571-48-T); asphalt composition battery containers (D-639-49-T); contact and migration stain of vulcanized rubber in contact with organic finishes (D-925-47-T), and finally revision of the tentative specification for rubber and synthetic rubber compounds for automotive and aeronautical applications (D-735-48-T).

Both the new and revised tentatives listed above are included in their latest form in the 1951 Compilation of Standards on Rubber and Rubberlike Materials, which was issued in May.

In the field of adhesives, the Standards Committee has accepted a new tentative recommended practice for determining the effect of moisture and temperature on adhesives bonds (D-1151-51-T), submitted by Committee D-14 on Adhesives. This recommendation is designed to establish certain non-cyclic conditions of tests under which the deteriorating effect of moisture and temperature may be determined.

Establish Emergency Alternates

In the interest of expediting procurement or conservation of materials during the national emergency, A.S.T.M. has established a procedure for the issuance of Emergency Specifications and Emergency Alternate Provisions, the mechanics of which will parallel those used during World War II. Among the first emergency alternate provisions approved were two on tape submitted by Committee D-11 to meet specific problems established by current rubber restrictions.

One of the provisions applies to the Tentative Specifications for Rubber Insulating Tape (D-119-48-T). This material, consisting of an unvulcanized or partially vulcanized rubber insulating compound which is not to contain more than 0.5% of free sulfur by weight of the original compound, has a normal requirement for tensile strength and elongation of 250 psi and 300%, respectively. The emergency provision provides that this can be lowered, if agreed on, to 200 psi and 250%, respectively.

The other provision covers the Tentative Specifications for Friction Tape for General Use for Electrical Purposes (D-69-48-T). In this case, the provision modifies the number of maximum permissible pinholes as follows:

Tape—Width In.	Number of Pinholes Max. Current Standard	Number of Pinholes Max. Emergency Provisions
½	12	6
1	16	8
1½	24	12
2	32	16

Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y., has made available its 1951 catalog of books and periodicals. Copies may be secured on request to the company.

Mourn Advent of Synthetic

When it was announced recently that a synthetic rubber plant would be built in Sao Paulo, Brazil, the legislative Assembly in Amazonas, the Brazilian state in which most of the country's rubber is grown, declared a three-day period of mourning, according to the American Brazilian Association.

ISO PLANNING OCTOBER MEETING FOR COMMITTEE ON TEST METHODS

The next meeting of the International Test Methods Committee, set up by the International Organization for Standardization (ISO) to deal with standardization of test methods in the field of rubber, will be held at Balliol College, Oxford, England, from October 1 through 5, 1951.

The comprehensive agenda which has been drafted for this meeting covers the following tests: Tension stress-strain; tear strength; hardness; ply adhesion; rubber-metal bond strength; abrasion; flex cracking; classification of vulcanized rubbers by physical properties; latex; aging; dynamic testing; technical classification of raw rubber; resistance to low temperatures; micro-hardness testing, and mechanical conditioning of test pieces.

It is expected that the formulation of international recommendations on the first four methods will be completed at the 1951 meeting; the last three subjects are being dealt with for the first time.

The British delegation appointed to attend these meetings includes J. M. Buist, A. W. F. Chatfield, L. Crompton, F. H. Edwards, G. L. Hammond, G. Martin, E. A. Murphy, W. J. S. Naunton, R. G. Newton, E. F. Powell, W. H. Reece, and J. R. Scott. The delegates have been working on the documents for this meeting for some time and all look forward to still further international agreement on rubber test methods.

The committee meeting will be preceded by a one-day conference which the Institution of the Rubber Industry has planned for September 28 at which visitors from overseas will present papers. A symposium on "Modern Methods of Studying Rubber Properties" will be given at the lecture theater of the Institution of Electrical Engineers, Savoy Place, London.

Heads Rubber Library at Akron

Betty Jo Clinebell has been appointed to the newly-created position of librarian of the Rubber Library located at the University of Akron. Her appointment was announced by Dr. B. S. Garvey, Jr., chairman of the Library Committee of the Division of Rubber Chemistry of the American Chemical Society. The library has been made possible by the Division, the Rubber Manufacturers Association and various rubber suppliers. It will include compilation of bibliographies, inter-library loans, and answer inquiries relating to rubber and allied products. Miss Clinebell has been working in the Science and Technology Division of the Bierce Library at Akron University. She was granted a bachelor of science degree from the University in 1949.

Ridgeway Reversible Auto Mat

Ace Rubber Products, Inc., Akron, Ohio, has introduced the "Ridgeway Reversible" mat for autos. As the name implies, the surface of the mat is transversed with modernistic ridges, and both sides are finished. The two usable surfaces mean that the mat can be reversed and will stay new-looking much longer. The rubber mat is non-marking and easy to clean.

TALK ON MACHINERY MOUNTINGS FEATURES NO. CALIF. MEETING

The May 31st meeting of the Northern California Rubber Group, held at the Elks' Club in Berkeley, Calif., featured an address by Ross E. Morris, senior rubber technologist of the Mare Island Rubber Laboratory. Mr. Morris spoke on "Rubber Mountings for Machinery." The speaker confined his discussion to vibration of motor mounts and the transfer of motion from the motor to the building, or vice versa. Although there are six degrees of freedom (directions of vibration) for a motor, Mr. Morris only considered vertical motion.

Mr. Morris stated that the problem is to have a mount that is not in resonance with the motion. To have dampening action with an iron spring and with a gum rubber mount, the motion must be more than the square root of two times the natural frequency of the mount. The natural frequency of a pure gum natural rubber stock approaches that of an iron spring, the speaker said. The frequency of both depends upon the deflection of the mount and can be calculated by the formula:

$$\text{Natural Frequency} = \frac{3.13}{\sqrt{\text{Deflection}}}$$

Rubber mounts excel steel springs in that they: (1) are lighter in weight; (2) resist corrosion and rust; and (3) are quieter at high frequencies. As the loading of fillers in the rubber is increased, the hysteresis is increased, and the mount deviates from the formula for a steel spring. In designing rubber mounts, the speaker said, it is a good idea to allow 10 to 20% for hysteresis.

Pure gum natural rubber is best for vibration rubber mounts followed by the neoprenes, especially Neoprene W. The problem of shock absorption is somewhat different as it requires a stock with high hysteresis with Hycar OR-15, channel black being good. To obtain the most efficiency from a given volume rubber as a mount, it is usually best to put the rubber in shear if the bonding can be accomplished.

Robert James, rubber technologist at Mare Island, then demonstrated a reed type instrument for determining vibration frequency and a test fixture for determining deflection under various loads. The discussion was concluded by the showing of slides which demonstrated the use of rubber mounts in the dampening of sound.

SPE Plans Chicago Meeting

"Plastics Horizons" is the theme for the Eighth Annual National Technical Conference of the Society of Plastics Engineers, Inc., to be held in Chicago, Ill., on January 16 through 18, 1952, at the Edgewater Beach Hotel. The conference will be sponsored by the Chicago Section of the SPE. The technical papers presented at the conference will examine the vital role of plastics in our present economy and in the National Defense Program, and the speakers will be men who readily know and understand the problems of the plastics industry.

Unusual Use for Koroseal

Puerto Rican sportsmen are reported to be setting new fishing records using bait made from strips of Koroseal flexible film, according to the B. F. Goodrich Co. Enrique Blanco, a distributor for the rubber company in San Juan, first introduced the idea last winter with notable success. Miguel Ferrer, also of San Juan, recently used the unique bait to boat a world's record 40 pound Allison tuna on light tackle. The new, inexpensive line is now being widely used in the islands by commercial as well as sports fishermen.

SOUTHERN OHIO RUBBER GROUP HOLDS ANNUAL SUMMER OUTING

The Southern Ohio Rubber Group held its annual outing on June 23 at McCrabb's Picnic Grove in Dayton, Ohio. A morning golf tournament was held at the Madden Park Golf Course, while other activities took place on the picnic grounds. Frank Newton (Dayton Rubber) served as chairman of the Outing Committee with Bill Nolan (Inland Mfg.) as associate chairman. Louis Wolk (Dayton Rubber) headed the Prize Committee, Bob Antheil (Inland Mfg.), the Golf Committee, while Dan Meyer (Dayton Rubber) headed the Recreation Committee. C. L. Zimmerman also served on the Outing Committee.

In the golf tournament, Low Gross honors were awarded to Louis J. Keyes (Dayton Rubber) Jack Feldman (Inland Mfg.) Ray Ritzert (Dayton Rubber) and Ray Naegel (Dow Corning) finished in the second, third and fourth positions. A baseball game between the "Peddlers" and "Industry" was won by the "Industry" team by a score of 14 to 8. Roy Marston (Binney & Smith) umpired the game. Other games played at the outing included horseshoes, croquet and cards. A fried chicken dinner was served after the games.

Rhode Island Holds Outing

Approximately 175 members and guests of the Rhode Island Rubber Group attended the Summer Outing and Golf Tournament held on June 21 at the Metacomet Golf Club in East Providence, R. I. The outing attracted the largest attendance in the group's history. Fred Newman (Respro), chairman of the Rhode Island Group, also served as chairman of the outing. The following members were prize winners in the golf tournament: *Low Gross*, A. Kroepel, F. Newman, and J. Salomon; *Low Net*, Peter Gimber, William Demers, and F. Burger; *Kickers' Handicap*, E. Braley,Mr. McClean, and Mr. Thompson; *Nearest Pin on 5th Hole*, C. R. Haynes; *Nearest Pin on 7th Hole*, Mr. Bergamini; *Nearest Pin on 10th Hole*, Seth Shorey; *Most 6's*, S. Szulik; *Most 7's*, J. Mazza; *Most 8's*, Jim Stott; *Longest Drive*, Fred Newman.

AKRON RUBBER GROUP HOLDS GALA ANNUAL SUMMER OUTING

The annual summer outing of the Akron Rubber Group was held at the Firestone Country Club on June 15. The feature of the program was a golf tournament in which 247 golfers participated. Many more of the 704 members present played on nearby courses. Other activities on the program were softball and horseshoe pitching, followed by dinner and distribution of prizes.

Low gross honors in the golf tournament went to John Cseh, Firestone Tire and Rubber Co., with a two-under-par 68. An accuracy prize went to John R. England. Instead of driving off the first tee, players used the "hand mashie," throwing for distance. Milt Leonard and Jack Graham tied with 70-yard tosses.

Other prize winning low scores were: Joe Shomock, 71; John Rowe, 76; H. B. McCreary, 77; Larry Jacobson, 80; Al Laurence, 81; R. S. Taylor, 83; J. C. Richards, 83; M. R. Batche, 84; and Allen Levin, 84.

Membership Committee Chairman V. L. Petersen, Goodyear Tire and Rubber Co., announced that the Group now has a record-breaking paid membership of 1286. Over 300 door prizes were distributed after dinner by means of a system employing registration and membership card numbers.

Ferde Bonstedt, Sid Richardson Carbon Co., was General Chairman of the outing; William V. Sauter, E. I. du Pont de Nemours and Co., was Chairman of the Prize Committee; Milt Leonard, Binney and Smith, was chairman of the Golf Committee, and L. V. Cooper, Firestone Tire and Rubber Co., was in charge of arrangements for food and location for the outing.

New York Holds Annual Outing

Approximately 140 members of the New York Rubber Group attended the annual outing held this year on June 14 at Doerr's Grove in Milburn, N. J. For the second consecutive year, rain fell on the outing day. However, a program of substitute events provided ample activity for all. George Vacca (Bell Telephone Laboratories) served as chairman for the outing and was assisted by Bob Carroll (R. E. Carroll), Art Merrill (*India Rubber World*), Bill Lamela (Okonite), John De Munnik (American Tile & Rubber), Henry Peters (Bell Telephone Laboratories), Bob Sterrett (Naugatuck Chemical), and George Brunt (Flintkote). Winners of the different events included the following: *Boccie*, M. R. Buffington and Harry Eckhardt (Lea Fabrics); *Darts*, Michael Masters and Gordon Voigt (Niagara Rubber); *Buck Horseshoes*, Frank Pace (Lea Fabrics) and Bill Lamela; *Basketball Throw*, M. J. Hall (Baker Castor Oil) and Michael Masters; *Ping Pong*, F. J. Millo and Stanley Rutkowski (Sindar Corp.). Door prizes were won by Jack Phelps (Rodic Chemical), F. C. Nicholas (Textile Proofers), Michael Masters, Bob Carroll, and Art Bald (Pittsburgh Plate Glass).

CIC RUBBER CHEMISTRY GROUP HOLDS MEETING IN KITCHENER

A series of factors at the Regional Conference of the Rubber Chemistry Division of the Chemical Institute of Canada held at the Walper Hotel in Kitchener, Ontario, on June 15 combined to make the meeting one of the best held to date by the group.

This included the presentation of eight technical papers, among which was one devoted to the production and evaluation of oil-extended rubbers now being made by the Polymer Corporation under arrangement with the General Tire & Rubber Co., and a banquet highlighted by an address by W. G. O'Neil, president of General Tire. Approximately 150 members and guests attended the technical sessions, while over 160 were at the banquet.

New Officers Are Elected

A brief business session was held during the morning session, at which officers for the 1951-52 season were elected. These included the following: *Chairman*, N. W. Smith (Dominion Rubber); *Vice-Chairman*, Tom Davies (Polymer Corp.); *Secretary-Treasurer*, George Stevens (Goodyear). The following were elected members of the Executive Committee: Eric Bolton (Goodyear), C. L. Brittain (Gutta-Percha), and Harry Hencher (Blachford). Jack Ramsey (Miner Rubber) was chairman of the Nominating Committee.

The technical sessions were held in the morning and afternoon, with four papers presented at each session. The morning session featured the following papers: Quality Control at No Cost for the Rubber Industry, by Gaston Fournier, Acton Rubber Co., Ltd., Acton Vale, Quebec; Hard Rubber, by E. D. Jackson, Joseph Stokes Rubber Co., Welland, Ontario; A Mid-Century Survey of Rubber Carbons, by H. A. Braendle, Columbian Carbon Co., New York, and White Carbon Black—What Is It, by V. H. Vodra, Wyandotte Chemical Co., Wyandotte, Mich.

Afternoon Session Features

The afternoon session featured the following: The Frosting of Vulcanized Rubber, by J. T. Beaudry, Dominion Rubber Co., Montreal, Quebec; Mechanical Rubber Goods with Special Emphasis on Latest Design and Testing Methods for Automotive Parts, by F. L. Haushalter, Firestone Industrial Products Co., Detroit, Mich.; Tires: Rubber in Service, by M. G. Morgan, B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, Ontario, and The Production and Utilization of Plasticized High-Molecular-Weight Synthetic Rubber, by H. D. Harrington and K. V. Weinstock, General Tire & Rubber Co., Akron, Ohio, and N. R. Legge and E. B. Storey, Polymer Corp., Ltd., Sarnia, Ontario.

(EDITOR'S NOTE: Abstracts of all of the papers listed above appeared in our May, 1951, issue. Some details concerning the paper on the new plasticized high-molecular-weight synthetic rubber, which is sold in Canada under the name of Polysar Krynol, are given elsewhere in this issue.)

As indicated above, the featured speaker at the divisional banquet, held at the Walper Hotel, was W. G. O'Neil, president of the General Tire & Rubber Co. J. T. Black, of the Polymer Corp., the retiring chairman of the division, first introduced J. R. Nicholson, executive vice-president of the Polymer Corp., who in turn introduced the featured speaker. He gave a brief resume of Mr. O'Neil's career, from the time he organized a tire distributorship in Kansas City to his present activities. Mr. Nicholson, incidentally, has tendered his resignation from the Polymer Corp. and it is reported that he will shortly join a prominent organization in Brazil.

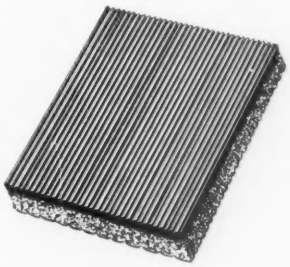
In his talk, Mr. O'Neil first made the point that synthetic rubber will never completely replace the natural product, but will rather result in the over-all expansion of rubber applications. He then outlined General Tire's position in the synthetic rubber field, and explained why the company had approached the Polymer Corporation to produce the oil-extended rubber developed by General's technical staff after negotiations had been broken off with the Office of Rubber Reserve.

A good portion of Mr. O'Neil's talk was devoted to the general benefits derived from research activities in the rubber and other fields. He made brief mention of the role being played by research in the jet propulsion field, particularly in the plant operated by General Tire on the West Coast. An appreciation of Mr. O'Neil's talk was expressed on the part of the Division by Ira Needles, vice-president of the B. F. Goodrich Rubber Co. of Canada.

The next meeting of the C.I.C. Rubber Chemistry Division will be held in Montreal, probably next June, in conjunction with the regular meeting of the parent society.

Lite-Step Floor Matting

Ace Hose & Rubber Co., Chicago, Ill., has introduced a new line of floor matting called "Lite-Step." The new mat presents an unusual combination of ⅛-inch corrugated rubber wedded to a ¼-inch



live sponge rubber base. The mat, which comes in all lengths and up to 72 inches in width, is intended for both back of the counter foot comfort as well as production-line working ease, and is said to give rug-like softness to even concrete floors.

ASTM 1951 ANNUAL MEETING SETS RECORD FOR ATTENDANCE

Featured by 23 technical sessions at which were presented 110 technical papers covering various aspects of engineering materials, the 1951 Annual Meeting of the American Society for Testing Materials, held throughout the week of June 18 at Atlantic City, N. J., also included 615 meetings of the technical committees. The registered attendance of 2,277 set a new high compared with the 1950 figure of 2,131.

Sixty-two of the society's technical committees reported at the meeting, with the result that 57 new specifications and tests were approved and revisions in over 200 existing tentatives and standards were acted on. About 75 specifications and tests that have been published previously as tentative were approved for reference to Society letter ballot for adoption as standard. All of these new and revised specifications will be published later in the 1951 Supplement to the Book of ASTM Standards.

Fuller Elected President

Truman S. Fuller, engineer in charge of the Works Laboratory, General Electric Co., Schenectady, N. Y., was elected president for 1951-52 succeeding L. J. Markwardt, assistant director, U. S. Forest Products Laboratory, Madison, Wisc., who continues on the board of directors as past-president for three years. L. C. Beard, Jr., assistant director of Socony-Vacuum Laboratories, Socony-Vacuum Oil Co., Inc., New York, N. Y., was elected vice-president. R. A. Schatzel, vice-president and director of engineering of the Rome Cable Corp., Rome, N. Y., was elected to the board of directors.

Frank L. LaQue, in charge of the Corrosion Engineering Section, International Nickel Co., New York, N. Y., presented the Edgar Marburg Lecture covering the subject "Corrosion Testing." Mr. LaQue evaluated many of the widely used tests such as acid procedure, rust color effects, salt spray test, peculiarities of immersion tests, galvanic corrosion and humidity tests, supporting his comments with a great amount of data.

The meetings of main technical committees and their subcommittees were in progress from June 17 through June 22. At times, there were as many as 50 meetings running simultaneously. A complete report on the activities of Committee D-11 on Rubber and Rubberlike Materials at the meeting will appear in an early issue.

Essex Wire Corp. Buys Plant

Essex Wire Corp. of Fort Wayne, Ind., has announced the purchase of a 200,000 square foot plant in Birmingham, Ala. Addison H. Holton, president, said his company plans to equip it with facilities from other plants. When in operation, it will manufacture the concern's entire line of strand and insulated wires. The building is located on a 14-acre tract which can be used for future expansion, company officials stated.

Detroit Group Summer Outing

About 310 members and guests of the Detroit Rubber and Plastics Group attended the Annual Summer Outing held this year on June 22 at the Forest Lake Country Club, Pontiac, Mich. About 175 members of the group participated in the golf tournament which was won by Gerald Walker (Permalastic Products) with a four-over-par 76. Other golf winners included W. Thimm (Ford) for the longest drive and Al Fuhrman (Minnesota Mining) for closest to cup. Ten players shared honors in the kickers' handicap. The following group arranged the golf tournament, prizes and entertainment: Howard Neale (Pioneer Latex), John Craft (General Tire), John Ledden (DuPont), Walter Bauer (Brown Rubber), and Tom Halloran (Chemical Products). The golf tournament was followed by cocktails and dinner. Some 200 door prizes were distributed.

Quebec Group Elects Officers

L. C. MacLeod (Monsanto-Canada) was elected chairman of the Quebec Rubber and Plastics Group for the 1951-52 season at the Annual Golf Outing held on June 8 at the Granby Golf Club, Granby, Que., Canada. The following members were elected to the Executive Committee for the 1951-52 season: R. G. Davies (Canadian Industries), William Edward (Delacour-Gorrie), G. Fournier (Acton Rubber), R. Harrison (Canadian G-E), A. S. Johnston (Northern Electric), H. A. Kushnarov (Dominion Rubber), C. W. MacEachern (General Latex-Canada), A. G. Pinard (Canadian Resins), M. Renshaw (British Rubber). About 70 members and guests participated in the golf tournament, while 90 attended the dinner. Low gross for the day went to C. P. Dearth (Bolta Plastics). The Golf Committee included Roger Davies (Canadian Industries) and R. C. Rea (Monsanto-Canada).

Symington Names Advisory Group

W. Stuart Symington, Administrator of the Reconstruction Finance Corp., has appointed a nine-man Rubber Industry Advisory Committee to assist in the formulation of RFC policy with regard to rubber. The nine members represent companies which operate government synthetic rubber plants and which use substantial quantities of synthetic and natural rubber. Asked to serve on the committee were: John L. Collyer (Goodrich); Harvey S. Firestone, Jr. (Firestone); A. L. Freedlander (Dayton Rubber); Frank D. Hendrickson (American Hard Rubber); H. E. Humphreys (U. S. Rubber); Paul W. Litchfield (Goodyear); Everett Morss (Simplex Wire); Thomas Robins, Jr. (Hewitt-Robins), and J. Penfield Seiberling (Seiberling Rubber).

Lamson Corp., Syracuse, N. Y., has announced a new two-reel talking picture entitled "Conveyors That Pay Dividends". The film depicts the manner in which conveyors are used in 14 different industries to effect new economies in operating procedures.

Coming Events

Aug. 3. Chicago Rubber Group, Summer Outing, Medinah Country Club, Chicago, Ill.

Aug. 7. New York Rubber Group, Golf Tournament, Baltusrol Club, Springfield, N. J.

Aug. 24. Philadelphia Rubber Group, Summer Outing, Cedarbrook Country Club, Philadelphia, Penna.

Sept. 3-7. American Chemical Society, 75th Anniversary Jubilee Meeting, New York.

Sept. 5-7. Rubber Division, A.C.S., Commodore Hotel, New York, N. Y.

Sept. 10-13. Section on Elastomers and Plastomers, 12th International Congress of Pure and Applied Chemistry, New York, N. Y.

Sept. 28. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

Oct. 5. Detroit Rubber & Plastics Group, Fall Meeting, Detroit-Leland Hotel, Detroit, Mich.

Oct. 8-12. National Safety Council, 39th National Safety Congress and Exposition, Chicago, Ill.

Oct. 19. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Oct. 19. Boston Rubber Group, Fall Meeting, Somerset Hotel, Boston, Mass.

Oct. 23. Buffalo Rubber Group, Fall Meeting, Hotel Westbrook, Buffalo, N. Y.

Oct. 23. Washington Rubber Group, Annual Banquet, Cosmos Club, Washington, D. C.

Oct. 26. New York Rubber Group, Fall Meeting, Henry Hudson Hotel, New York, N. Y.

Nov. 9. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

Nov. 14-15. Rubber-Stichting, International Symposium on Abrasion and Wear, Delft, Holland.

Nov. 16. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Nov. 25-30. A.S.M.E., Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

Nov. 26-Dec. 1. 23rd Exposition of he Chemical Industries, Grand Central Palace, New York, N. Y.

Dec. 14. Boston Rubber Group, Xmas Party, Somerset Hotel, Boston, Mass.

Dec. 14. Chicago Rubber Group, Xmas Party, Morrison Hotel, Chicago, Ill.

Dec. 14. Detroit Rubber & Plastics Group, Xmas Party, Detroit-Leland Hotel, Detroit, Mich.

Dec. 14. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 18. Buffalo Rubber Group, Xmas Party.

ASTM Exposure Test Site Planned

The American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna., is planning a new exposure test site program. ASTM exposure tests have thus far dealt with metals. The organization is now planning to broaden the scope of this work to include adhesives, paints, plastics, rubber, textiles, wood, and combinations of different materials, in addition to metals. The minimum number of sites has been selected so as to insure the necessary wide range of conditions including industrial, rural, marine and tropical atmospheres. These sites will be available to all committees of the Society, and to other organizations under certain conditions. The establishment, maintenance, and administration of these test sites have been placed under the centralized authority of the Advisory Committee on Corrosion and the Society has provided an engineer from Headquarters Staff to service them. The centralization will result in better control of test sites, uniformity of equipment, operations, etc., and consequent lower costs of operation.

General Tire Buys Tool Plant

General Tire & Rubber Co., Akron, Ohio, has purchased the Grieder Machine Tool & Die Co., Inc., of Bowling Green, Ohio, in a move to enlarge its Metal Products Division. General Tire has a smaller metal products plant in Cuyahoga Falls, Ohio, which has been doing machine work for its domestic and foreign plants. The Grieder factory has been virtually idle for the past two years. General Tire plans to step up employment at the plant immediately. The company said that it is spending more than $1,000,000 in enlarging its Metal Products Division, of which the Grieder unit is now the principal part. The division has received contracts for aircraft and fire control systems. George E. Smith, coordinator of the company's government business, has been temporarily named general manager of the plant. Clarence Clyne, formerly in charge of manufacturing for Bell & Howell, Chicago, Ill., has been named works manager of the new plant.

Boston Outing Held in Rain

The Boston Rubber Group held its Fifteenth Anniversary Outing on February 15th at the United Shoe Country Club in Beverly, Mass. Approximately 480 members and guests attended the dinner, but only 71 persons participated in the golf tournament because of rain which canceled all other athletic events. In games held indoors, C. M. Grafton, E. Collins, R. Gerade, P. Bratenas and J. Lang scored a five-way tie in a dart game. Charles Wilson, Al Brown and Mr. Maflen finished 1-2-3 in the high single bowling tourney. Winners of the golf tournament included: *Kickers' Handicap*, F. S. Post, A. W. Bryant, and N. Manning; *Low Gross*, Charles Hamilton, A. Lacouture, J. K. Magrane; *Low Net*, E. G. Swanson, R. B. Watts, and P. Burnett; *Nearest Pin*, R. E. Nippes; *Highest Net Score*, C. E. Roder.

Named Harwick Sales Manager

Dale E. Behney

Dale F. Behney, associated with the Harwick Standard Chemical Co., Akron, Ohio, since May, 1950, has been appointed manager of sales for the company. Mr. Behney was graduated from North Caroline State College of Agriculture and Engineering with a degree in chemical engineering. Before joining Harwick, Mr. Behney was with the Goodyear Tire & Rubber Co., where he served in development, tire design and technical service until 1939. In 1940, he was made supervisor of Banbury training, and later, compounder for Airform development. In 1941 he became purchasing agent of equipment for the Defense Plant Corp. and the Goodyear Synthetic Rubber Corp. Mr. Behney also served as chemical buyer of Goodyear's Chemical Division. He is a member of the American Chemical Society and the Society of Plastics Engineers.

To Build Vinyltoluene Plant

Dow Chemical Co., Midland, Mich., is planning to build a new plant to produce vinyltoluene which is made from toluene and ethylene. Vinyltoluene is a substitute for styrene, which is made from benzene and ethylene. In all trials to date, vinyltoluene has proved a satisfactory substitute for styrene in the manufacture of synthetic rubbers and plastics. While benzene is in short supply, toluene is comparatively plentiful. The new plant will be located in Midland and will cost about $8,000,000. Ground for the plant will be broken late this fall and it is expected that production will be underway by July, 1952.

Named Akron University Head

Dr. Norman P. Auburn, formerly vice-president and dean of the University of Cincinnati, has been named president of the University of Akron. The 46-year-old educator was selected for the post by the board of directors of Akron University on June 29. He will take over the position on September 1. Dr. Auburn succeeds Dr. H. E. Simmons, who, after 18 years in office, is giving up the post under a rule requiring retirement at age 65.

WASHINGTON APPOINTMENTS

Dr. H. I. Cramer, director of development of Sharples Chemicals Inc., has accepted a temporary assignment with the Office of Price Stabilization, as Chief, Aliphatic Chemicals, Rubber Chemicals Section, Rubber Chemicals and Drugs Division.

Ernest A. Tupper, management consultant of Washington, D. C., and former government economist, has been named special assistant to Manly Fleischmann, Administrator of the National Production Authority.

Edward W. Greb, of Lake Worth, Fla., who has been serving as chief of the Industrial Salvage Branch of the Salvage and Reclamation Division of NPA, has been named acting director of the division.

John F. Corwin, on loan from the Chemical Division of the Koppers Co., Pittsburgh, Penna., has been appointed chief of the Resins, Plastic Materials and Adhesives Section, Chemical and Drugs Branch, Rubber, Chemical and Drug Division, Office of Price Stabilization.

German Synthetic Production

Production of synthetic rubber at the rate of 1,500 tons per quarter will soon be started by the Chemische Werke Huls Co., Huls, Germany. The Huls plant, the only major producer of synthetic rubber still left in Western Germany, which turned out as much as 40,000 tons of synthetic rubber in 1943, was given permission to rebuild its four remaining butadiene reactors which had been partly dismantled in 1949. Fourteen other reactors were completely dismantled at that time. The company was also given permission to operate six additional reactors for the production of styrene. This is equivalent to an increase of 50% in the firm's current styrene output. It is believed that part of the surplus styrene production will also be used for synthetic rubber. The remainder will go into the production of polystyrene. According to present plans, the increase in styrene production will become effective in October. Butadiene production will also get under way during that month, so that the first synthetic rubber should be available by November.

Plan 23rd Chemical Exposition

With the announcement that the 23rd Exposition of the Chemical Industries will be held in New York City on November 26 to December 1, it was revealed that arrangements have been made to utilize all available exhibit space on the four exposition floors of Grand Central Palace. Advance space reservations and applications indicate an exceptionally heavy concentration of exhibits this year in the two divisions of chemical materials and processing equipment. The exposition is under the management of the International Exposition Co. of New York. E. R. Weidlein, director of the Mellon Institute, is chairman of the advisory committee of the 1951 exposition.

Powers Named Chemical Director

Dr. Paul O. Powers

Dr. Paul O. Powers has been named chemical director of the Pennsylvania Industrial Chemical Corp., Clairton, Penna. Formerly technical advisor to the Battelle Memorial Institute, Dr. Powers will be concerned with coordinating research activities, technical service, chemical laboratory work and pilot plant operation in the maintenance of synthetic resins, solvents, oils and other products. He will also continue to serve as an advisor to the National Research Council on Quartermaster problems. A graduate of Boston University, Dr. Powers obtained his master's and Ph. D. degrees from the University of Pittsburgh. During his career, he has been associated with the Atlantic Dyestuff Co., Calco Chemical Co., New England Color Works, and Newport Industries, Inc. He also taught chemistry for three years at the University of Pittsburgh and was a research fellow at the Mellon Institute of Industrial Research.

Goodyear Votes Stock Split

The board of directors of the Goodyear Tire & Rubber Co., meeting in Akron on June 25, authorized a two-for-one stock split in the common shares of the company. The split will apply to stock of record on August 15, 1951. A dividend of 75c per share on the split stock was also authorized by the board. It will be payable on September 15 to stock of record on August 15. In 1950, the common stock paid dividends totaling $5 per share. The regular dividend of $1.25 per share on the company's $5 perferred stock was also declared at the meeting. It is payable on September 15 to stock of record on August 15.

Hercules Dresinol 155

A new non-solvent type, high-melting resin dispersion, "Dresinol 155," is now available in commercial quantities from the Hercules Powder Co., Wilmington, Del. The product can be used as a modifier and extender for synthetic or natural rubber latices in adhesives, supported films, and binders of all types. The new resin dispersion is said to be completely compatible with all types of latices.

NEWS IN BRIEF

Aldrich Pump Co., Allentown, Penna., has made available Data Sheet 64-A which describes the company's recently developed 3-inch stroke Direct Flow Triplex Pump.

A process which cleans steel cartridge cases 50% faster than conventional methods has been announced by Goodrich. The new system is the defense version of a continuous process for cleaning and pickling steel which utilizes the Goodrich-Curran automatic spray pickling machine.

Jute bobbins are being molded by Jacobus Plastics of Jacobus, Penna., from a rubber-phenolic compound manufactured by the Chemical Department of the General Electric Co.

Celebration of the 25th anniversary of the Cedartown, Ga., textile mill of the Goodyear Tire & Rubber Co., was held on May 12 with a parade, barbecue and an open house. The unit was said to be the first tire cord fabric operation in the Southeast.

Ninety-nine new and revised American Standards are listed in the latest edition of the "Price List of American Standards" just published by the American Standards Association, 70 East 45th St., New York 17, N. Y. Copies may be obtained on request.

Four new booklets on safety, designed for distribution by plant foremen or as payroll enclosures, have been announced by the National Safety Council. Sample copies and prices may be obtained from the Council at 425 N. Michigan Avenue, Chicago 11, Ill.

A new 16mm. sound motion picture, "Speaking of Rubber," has been produced by U. S. Rubber and is now available for showing. The movie is in black and white with a running time of 27 minutes. Its theme is the importance of rubber in everyday life.

The Chemical Plants Division of the Blaw-Knox Co. has received a contract from Sharples Chemicals, Inc., for engineering and construction work to increase the capacity of Sharples' alkylamine facilities at Wyandotte, Mich., originally constructed by Blaw-Knox.

A continuous flow chart illustrating methods of production, from the basic raw material to the finished product, of soda ash, chlorine, caustic soda, calcium carbonate, dry ice, and other inorganic chemicals has been made available by the Wyandotte Chemicals Corp., Wyandotte, Mich.

The Ninth Edition of "Petroleum Facts and Figures" is now available from the Department of Information of the American Petroleum Institute, 50 West 50th St., New York 20, N. Y., for $2.50 a copy. In addition to the long-term series of tables on utilization, production, refining, marketing, transportation, price and taxation, the Ninth Edition contains a new series of tables on business, operating and allied statistics on oil and the oil industry.

The Rubber Manufacturers Association, 444 Madison Ave., New York 22, N. Y., has released the 1951 edition of its display poster containing correct tire inflation pressures recommended for all cars originally equipped with low-pressure tires.

Sun Rubber Co., Barberton, Ohio, has been cited for "outstanding effort and achievement" as a group winner in the Barberton Safety Campaign for 1950.

Development of a new non-toxic chemical to kill mites, tiny bugs which have become a problem for fruit growers, chicken farmers and home gardners, has been announced by Naugatuck Chemical.

Production of pneumatic tires for motor vehicles by Goodyear recently reached a total of 525,000,000 units, with a military truck tire (11.0 x 20) marking the significant milestone casing.

Brookfield Engineering Laboratories, Inc., Stoughton, Mass., has announced the availability of the "Brookfield Viscosity Packet", which is designed to provide complete up-to-date information about both the Brookfield Viscometers and the general subject of viscosity.

American Cyanamid Co. has entered into a contract to lease a 60,000 square-foot building to house its operations in Boston, Mass. The building will be leased to the company for a long term of years and total rental will exceed $1,000,000.

Resistance to chemical attack, grease, and protection against moisture vapor transmission are insured in fiber drums manufactured by the Virginia Barrel Co., Chester, Penna. The drums receive an inner coating of Geon polyvinyl chloride latex.

The Synthetic Organic Chemicals Department of the American Cyanamid Co. has announced that aero cyanuric chloride is now in greatly increased commercial production at the Warners, N. J., plant.

The Chicago midwest headquarters of the Sarco Co., Inc., was moved on April 30 to new and larger space at 322 West Randolph St., Chicago 6, Ill. The new telephone number is Andover 3-2513.

Sales divisions of the B. F. Goodrich Co. have moved to new offices at 230 Park Avenue, New York, N. Y., the same building in which the company's executive offices are located. The divisions include: Tire, Industrial, International, Drug Sundries, and Flooring.

The Electrical Wire & Cable Department of U. S. Rubber has published a new catalog on specifications and engineering characteristics of latex-insulated telephone cables. The booklet is obtainable from the department's headquarters in Rockefeller Center, New York City.

The general executive offices of Glass Fibers, Inc., have been moved to 1810 Madison Avenue, Toledo 2, Ohio. The administration, sales and purchasing offices of the company are all located at the new address.

Goodrich has published a new booklet entitled "One Week for America" which describes methods used by the company in carrying out a successful campaign for the installation of payroll savings for purchase of U. S. Bonds.

Thiokol Corp., Trenton, N. J., has published a reprint of the article "Polysulfide Liquid Polymers" by J. S. Jorczak and E. M. Fettes, which originally appeared in the February, 1951, issue of *Industrial and Engineering Chemistry*. Copies are available from the company.

Toscony Fabrics, Inc., New York, N. Y., has developed a new material in which fabric colors and designs are printed on an opaque layer of Vinylite plastic film. The film, in turn, is overlaid with an embossed surface layer of transparent film which acts as a protective layer. The material finds use in fashion goods, draperies, etc.

Plug-in ballasts for fluorescent lighting units are being molded from rubber-phenolic compounds produced by the General Electric Co. The ballast housings are being molded for the Kulka Electric Manufacturing Co., Mt. Vernon, N. Y., by Plastic Products, Inc., Norwalk, Conn.

Formation of a new jointly-owned company to manufacture an air filter first used by the Atomic Energy Commission to keep radioactive particles out of the atmosphere, has been announced by Arthur D. Little, Inc., of Cambridge, Mass., and the Carrier Corp., Syracuse, N. Y. The new company, known as the Cambridge Corp., is headquartered in Syracuse and initial production of the filter is under way.

Detecto Scales, Inc., Brooklyn, N. Y., has purchased the Yale scale business of the Philadelphia Division of the Yale & Towne Manufacturing Co.

Monsanto Chemical Co has announced plans to operate a major plastics plant at Addyston, Ohio, as part of its $22,000,000 expansion program. Installation of equipment will begin soon with production expected early in 1952.

DOUBLED PRODUCTION OF

STATEX·R

...as announced last month, evidences
our constant endeavor
to keep pace with
the requirements of the
Rubber Industry

MPC (Medium Processing Channel)
STANDARD MICRONEX

◆

EPC (Easy Processing Channel)
MICRONEX W-6

◆

HAF (High Abrasion Furnace)
STATEX-R

◆

FF (Fine Furnace)
STATEX-B

◆

FEF (Fast Extruding Furnace)
STATEX-M

◆

HMF (High Modulus Furnace)
STATEX-93

◆

SRF (Semi-Reinforcing Furnace)
FURNEX

◆

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

Piccolyte Production Resumed

Pennsylvania Industrial Chemical Corp. resumed production of Piccolyte Resins on June 25 at its plant in Clairton, Penna. Because a fire and explosion had destroyed the manufacturing facilities of its supplier of beta pinene, the company was forced to suspend shipments of Piccolyte Resins on May 29. Beta pinene is the starting raw material for the resin. The company has also begun production of beta pinene at its plant in Chester, Penna. Equipment at Chester, previously used to fractionate styrene from xylene, was found suitable for fractionating alpha and beta pinene. This equipment has been isolated and supplied with feed tanks, pumps, lines, storage tanks, etc., so that production of beta pinene can be begun in the event of any similar occurrence in the future. The beta pinene manufacturing equipment will be continued in operation until Pennsylvania Industrial Chemical's raw material supplier is again in production. The equipment may also be used to increase production of Piccolyte Resins.

Rubber Industry Injury Rates

American workers were a lot safer in 1950, the National Safety Council reported recently. Industrial injury rates for 1950, released by the Council in advance of the 1951 edition of its annual statistical yearbook, "Accident Facts," show a substantial reduction in both the frequency and severity of 1950 accidents as compared with 1949. The rubber industry, however, in both frequency and severity, fell below 1949 standards. The rubber industry suffered 7.05 injuries per 1,000,000 man-hours worked in 1950, 38% higher than in the previous year. As to severity rate, time charges (in days) per 1,000 man-hours, the rubber industry set a figure of 70, 37% above figures for 1949. Of the 40 industries reporting, 29 reduced their frequency rates, and 23 reduced severity rates. The accident frequency rate for employees in all industries submitting reports to the Council, based on the number of disabling injuries per 1,000,000 man-hours, was 9.3 in 1950, a reduction of 8% from the year before.

Penacolite G-1260 Adhesive

A new room-setting adhesive, using 40% less of scarce resorcinol, yet able to pass stringent tests heretofore met only by straight recorcinol adhesives in the room-setting temperature field, has been announced by the Chemical Division of the Koppers Co., Pittsburgh, Penna. Developed at the company's Petrolia, Penna., plant, the new modified resorcinol adhesive is known as Koppers Penacolite G-1260. The new adhesive has been thoroughly tested in the stringent test schedule of specification JAN-A-397 with results entirely compatible with those obtained from straight recorcinol adhesives. Because Penacolite G-1260 uses 40% less recorcinol, cost may be cut 30% or more through its use. The strength and durability of the new adhesive comes as the result of an entirely new technique in the reaction of phenol, resorcinol and formaldehyde.

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those in our previous issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue. Normally, experimental polymers will be produced only at the request of the consumers and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside if possible for distribution to other interested companies for their evaluation. The 20 bales when available will be distributed in quantities of one or two bales upon request to the Sales Division of Rubber Reserve or will be held for six months after the experimental polymer was produced unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received to warrant them.

X No.	*Polymer Description*
X-645 GR-S	Same as GR-S-18 except shortstopped with sodium or potassium dimethyl dithiocarbamate or dimethyl ammonium dimethyl dithiocarbamate and stabilized with 1.25% ELGL
X-646 GR-S	A masterbatch of 100 parts of a high Mooney GR-S X-630 polymerized at 117°F and 25 parts of processing oil Circosol 2XH. Mooney viscosity of the masterbatch 45; stabilized with 1.35% PBNA on the rubber.
X-647 GR-S	GR-S-101 shortstopped with sodium or potassium dimethyl dithiocarbamate alone or plus sulfur as sodium polysulfide.
X-648 GR-S	Same as X-598 (X-607, X-608, X-609) except polymerized at 54°-57°F and bound styrene content of unpigmented polymer 20 ± 1%.
X-649 GR-S	Same as X-637-GR-S except butadiene/styrene charge ratio adjusted to give 16.5 ± 1% bound styrene.
X-650 GR-S	Same as GR-S-10 except butadiene/styrene charge ratio adjusted to give 20± 1% bound styrene.
	Please Note Changes Made in the Following Experimental Polymers
X-636 GR-S	Shortstopped with sodium or potassium dimethyl dithiocarbamate alone or plus sulfur as sodium polysulfide.

NOTE: The above new polymers are experimental only and the Office of Rubber Reserve, Reconstruction Finance Corporation, does not make any representation or warranties of any kind, express or implied, as to the specifications or properties of such experimental polymers, or the results to be obtained from their use.

Koroseal hose, made to withstand air pressure, is being used in the "Head-On Carbon Blaster", a new unit developed by the Kent-Moore Organization of Detroit, Mich., for the removal of carbon and other objectionable deposits from automobile engines.

Employees of the Aluminum Flake Co., Akron, Ohio, were recently honored by the Industrial Commission of the State of Ohio for compiling a 100% safety record during the year 1950.

Rubber-phenolic molding powder, manufactured by the Chemical Department of the General Electric Co., is being used by the Auburn Button Works, Auburn, N. Y., in molding eyepieces for Bausch and Lomb safety goggles.

The Industrial Products Division of the Flintkote Co., New York, N. Y., has issued a new four-page folder on "Mastic Flooring Underlayments". The composition and mixtures for asphalt emulsion and rubber latex binders are described together with recommended practice in application.

New magnesium airplane wheels capable of carrying a record-breaking 60,000 pounds each have been perfected for the U. S. Air Force's B-47 jet bomber by Goodrich. Incorporating a new design, the wheels measure 56 by 16 inches and have supported 325,000 pounds in tests, a five-to-one safety factor.

"The Strange Case of the Seven-Sided Post Hole" is the title of a whimsical booklet published by the American Standards Association which suggests the confusion and waste that exist when each manufacturer in an industry makes his product "as different as possible." The booklet recounts the advantages gained by industry when it agrees on voluntary standards, clearing these through the ASA.

The L. H. Gilmer plant of the U. S. Rubber Co. at Philadelphia, Penna., was recently honored by the National Safety Council, the Philadelphia Safety Council, the Safety Bureau of the Chamber of Commerce of Greater Philadelphia and other organizations in recognition of a perfect safety record during 1950.

NAMES IN THE NEWS

ELMER L. JOHNSON, JR., associated with the U. S. Rubber Co. since 1944, has been named as assistant to the manager of the company's plant at Scottsville, Va., succeeding STEPHEN A. WARD, who has been transferred to the firm's combed yarn plant in Gastonia, N. C., as assistant to the plant manager.

MARSHALL L. HAVEY, having reached retirement age, recently resigned as executive vice-president of the New Jersey Zinc Co. He will continue, on a part-time basis, on special assignment as assistant to the president.

I. MELVILLE STEIN, associated with Leeds & Northrup Co. since 1919, has been named to the newly-created post of executive vice-president of the company.

SAMUEL R. PHILLIPS, who joined U. S. Rubber Co. in 1939, has been named as assistant to the general manager of the Textile Division of the company.

JERRY SHAW, Editor of *Tires Service Station Magazine*, has been named publisher while retaining the title of editor.

HENRY H. STILLER, vice-president of the Advance Solvents & Chemical Corp., and Gerry P. Mack, director of technical research, have recently returned from an extended European trip.

WILLIAM J. MILLER, formerly treasurer of the U. S. Alkali Export Association, Inc., has been named export manager for the Southern Alkali Corp., a wholly-owned subsidiary of the Pittsburgh Plate Glass Co.

RICHARD W. SABINE, formerly senior staffman in charge of mechanical goods advertising and sales promotion for the Goodyear Tire & Rubber Co., has been named manager of distributor sales in the company's Mechanical Goods Division succeeding W. T. BELL, who died recently.

ROBERT M. LUNDGREN, for the past five years closely associated with engineering and construction programs, has been named vice-president of the Kuljian Corp., Philadelphia, Penna.

DAVID C. DOUGHERTY, supervisor of organization planning for the American Hard Rubber Co., has been elected treasurer of the Society for the Advancement of Management.

HARVEY S. FIRESTONE, JR., chairman of the board of the Firestone Tire & Rubber Co., and E. J. THOMAS, president of the Goodyear Tire & Rubber Co., were awarded honorary degrees of Doctor of Laws (LL.D.) by the University of Akron at its 79th Annual Commencement.

WALTER A. HAZLETT, managing director of the Goodyear Tyre & Rubber Co. in Great Britain, received his 45-year pin while on a return visit to Akron, Ohio, recently.

AARON COUTTS, 27, president, of the Rubber Corp. of California, Gardena, Calif., was recently elected a member of the Young Presidents' Organization.

JOHN W. JORDAN, formerly secretary of the Brown Co., Berlin, N. H., has been elected vice-president and general counsel of the company.

MILTON R. RODMAN, formerly assistant credit manager for the Seiberling Rubber Co., has been promoted to credit manager of the company.

HARRY N. STEVENS, previously director of patents and abstracts at the Research Center of the B. F. Goodrich Co. at Brecksville, Ohio, has been named director of colloid and textile research for the company.

DR. HOWARD E. FRITZ, vice-president-research, DR. WILLIAM L. DAVIDSON, director physical research, and DR. WALDO L. SEMON, director pioneering research, of the B. F. Goodrich Co., are in Europe on a six-week visit to laboratories and research facilities in England, Denmark, France, Germany, Italy, Holland, Sweden and Switzerland. They also will attend meetings of the Society of Chemical Industries in England.

C. L. TAYLOR, JR., previously associated with the General Aniline & Film Corp. in Binghamton, N. Y., has joined the Marbon Corp., Gary, Ind., as chief engineer in charge of all engineering work.

BERNARD H. JACOBSON, formerly vice-president of Ohio-Apex, Inc., Division of Food Machinery & Chemical Corp., has been elected president of Ohio-Apex succeeding ANDREW A. PAYNE, who has been named board chairman. PAUL E. WILLARD was recently appointed assistant director of research.

MARVIN LARSON, who joined American Resinous Chemicals Corp. a short time ago, has been named sales representative for the company in the Chicago, Ill. area.

E. H. DOURS, associated with the Goodyear Tire & Rubber Co. since 1948, has been named sales manager of the Pliofilm Department.

LLOYD L. SCHRADER, formerly superintendent of personnel and industrial relations at the Morgantown Ordnance Works, has been named manager of the Industrial Relations Department of the Heyden Chemical Corp., with headquarters at Garfield, N. J.

JULIAN PAUL, associated with the Carbide and Carbon Chemicals Co., a division of the Union Carbide and Carbon Corp., for the past 15 years, has been named assistant product manager of the Fine Chemicals Department of the company, succeeding JAMES J. MORRIS who recently joined NPA.

HENRY C. SPEEL, formerly associated with the General Dyestuffs Corp., has been appointed director of the Development Department of the Wyandotte Chemicals Corp., Wyandotte, Mich.

DEANE WALDO MALOTT, newly-appointed president of Cornell University, has been elected a director of the B. F. Goodrich Co.

DR. ROBERT C. SWAIN, vice-president in charge of research and development for the American Cyanamid Co., has been elected honorary chairman of the American Section of the Society of the Chemical Industry for the 1951-1952 season.

WADE C. RUBLE, formerly manager of employment in the Akron operations of the B. F. Goodrich Co., has been transferred to the tire plant at Los Angeles, Calif., as personnel manager.

DR. C. A. STOKES, director of research and development for Godfrey L. Cabot, Inc., has been elected "Kingfish" of the "Icthyologists" of the Boston Chapter of the American Institute of Chemical Engineers for the 1951-1952 season.

WILLIAM A. BOURS, III, associated with E. I. du Pont de Nemours & Co., Inc., for the past 10 years, has been named manager of the Plants Development Section of the Organic Chemicals Department succeeding DR. GEORGE E. HOLBROOK, who was named assistant director of the Development Department.

JOHN E. POWERS, since 1934 associated with the General Tire & Rubber Co., has been appointed trade sales manager of the company.

THOMAS N. REDFERN, associated with the U. S. Rubber Co. since 1920, has been named plant engineer of the Providence, R. I., plant. PETER J. MCGUIRE, formerly supervising project engineer of the Providence plant, has been named assistant plant engineer.

EDWARD ROSENDAHL, executive vice-president of the Glyco Products Co. of Brooklyn, N. Y. and Natrium, West Va., has been elected a member of the board of directors of the Brooklyn Chamber of Commerce.

WILLIAM D. GOHR, formerly purchasing agent for the Firestone Tire & Rubber Co., has been named general manager of the company's Plant 3 in Akron, Ohio.

ALLEN H. OTTMAN, vice-president and controller of the American Hard Rubber Co., has been elected president of the New York Chapter of the National Association of Cost Accountants.

Pittsburgh Coke Names Avery

Henry Avery

Henry Avery, formerly associated with Godfrey L. Cabot, Inc., has been appointed manager of the Plasticizer Division of the Pittsburgh Coke and Chemical Co., Pittsburgh, Penna. In his new position, Mr. Avery will be responsible for directing and coordinating the division's sales, production, technical service and development activities. A graduate of the Massachusetts Institute of Technology in 1941, Mr. Avery served with the U. S. Army Ordnance Department during World War II. In May, 1947, after a year at the Florida naval stores plant of Godfrey L. Cabot, Inc., Mr. Avery was transferred to Cabot's Boston, Mass., headquarters as plasticizer sales and product development manager. While in Boston, Mr. Avery was chairman of the Luncheon Committee of the New England Marketing Association and secretary of the Boston Section of the American Institute of Chemical Engineers.

Conveyor Belting For Mines

A major part of the production of rubber conveyor belting at the B. F. Goodrich Co. is destined for American mines producing raw materials for defense industries, according to company officials. Nearly 40% of the conveyor belting being made in the company's new $5,000,000 industrial belting plant will be delivered to coal, iron ore and other mines. The remainder will go to major processing industries, public utilities and construction projects. Despite the greater production made possible by the opening of its new plant, Goodrich now has a 500,000 foot backlog of conveyor belting orders on its books, officials said.

Directory of Export Agents

The Commerce and Industry Association of New York, Inc., 233 Broadway, New York 7, N. Y., has published the 1951 edition of the "Directory of New York Export Sales Representatives." Listed are members of the Association who are exclusive overseas distributors for manufacturers in all parts of the United States, acting in many cases as the manufacturers' export departments.

LABOR NOTES

B. F. Goodrich Co. and the Firestone Tire & Rubber Co. were scheduled to open wage negotiations with the United Rubber Workers, C.I.O., on July 10. The union was to have demanded a "substantial wage increase," according to union president L. S. Buckmaster.

Members of Local 399 of the URW ended their strike of nearly three months at the plant of the Johnson Rubber Co. in Middlefield, Ohio, on June 27. The union accepted the company's offer of a new one-year contract providing for a 2c hourly wage increase, a modified union shop and other benefits. Seven hundred production workers were involved.

Officials of Goodyear Local 2, URW, were to have asked members for authority to cancel the present contract with the company in a meeting on June 16. Differences which have recently come up may lead to a walkout of more than 15,000 Goodyear workers in Akron. Meantime, the Goodyear plant at Lincoln, Neb., was closed on June 16 by a strike after contract negotiations collapsed.

Vinylite Finds Use in Printing

Reproduction of maps, charts and similar subjects at lower cost and in less time is being accomplished by making color proofs on Vinylite plastic rigid sheet instead of printing them from regular lithographic plates. Vinylite plastic rigid sheet is grained and supplied for this purpose by Direct Reproduction Corp., Brooklyn, N. Y. The exceptionally high dimensional stability of this plastic is said to permit preparation of a multi-color proof in less time than is required to process metal plates and provides a proof of superior quality in perfect register. The process, developed by the U. S. Coast and Geodetic Survey, can be performed directly from either color separation negatives or positives. When a satisfactory color proof has been produced on a plastic sheet from the corrected color negatives or positives, they are then used to make the metal lithographic plates from which the maps are printed.

Named DuPont Chemical Director

Dr. Cole Coolidge, formerly assistant director of the Chemical Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., since 1939, has been named director of the department succeeding Dr. Elmer K. Bolton who retired from the company on June 30 after 21 years as director. Dr. Coolidge joined the Chemical Department as a research chemist in 1923, shortly after completing his graduate work at Ohio State University. Within three years he was made a group leader, directing other research workers along special lines. In 1927, he was named assistant director of the DuPont Experimental Station near Wilmington, and served in that position until 1939, when he was appointed assistant director of the Chemical Department.

Gotshall Joins Binney & Smith

John A. Gotshall

John A. Gotshall, formerly associated with the Goodyear Tire & Rubber Co., has joined the sales staff of the Binney & Smith Co., with headquarters in Akron, Ohio. Born in Magnolia, Ohio, in 1916, Mr. Gotshall was graduated from Wooster College where he majored in chemistry. His first business connection was with Goodyear selling shoe materials. In 1942, he joined that company's Chemical Engineering Division and from 1945 to 1947 was in charge of the viscose rayon plant. From 1948 until 1951, Mr. Gotshall headed the synthetic and chemical pilot plant.

NBS Establishes New Laboratory

The establishment of a new National Bureau of Standards laboratory center at Corona, Calif., to be devoted to various phases of electronic research, development, and engineering was recently announced. To be known as the Corona Laboratories, the new research center will be primarily concerned with technical problems of importance to the Department of Defense. The site was transferred to NBS by the Department of the Navy because of the Bureau's urgent need for new facilities. About 22 buildings are being renovated to accommodate NBS research and development activities being transferred there from Washington, D. C. Dr. R. D. Huntoon, formerly chief of the NBS Atomic and Radiation Physics Division, has been named associate director to head the new laboratories. Limited operations began in June and full-scale operations will begin in September.

Recovers From Recent Fire

Whittaker, Clark & Daniels, Inc., New York, N. Y., have completely recovered from the fire that destroyed their sample room and stock of talc and metallic soap catalogs at their South Kearny, N. J., plant. The sample room has been rebuilt and the catalogs have been replaced. All requests made previous to the fire have been filled and new inquiries are being handled promptly as received. Although both the talc catalog and the metallic soap catalog are free, distribution is restricted to manufacturers.

LITCHFIELD CITES INEFFICIENT USE OF SYNTHETIC FACILITIES

Inefficient use of America's synthetic rubber plants cost the consuming public an additional $500,000,000 for the year ending May 1, 1951, P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Company, disclosed recently. Mr. Litchfield, reviewing the current situation in a new issue of his "Notes on America's Rubber Industry", points out that skyrocketing prices of natural rubber last year resulted from inadequate synthetic production, inventories and stockpile.

Mr. Litchfield warned that while the situation is returning to normalcy with an anticipated better balance between supply and demand in the next two years, the same debacle can occur again in the future unless the nation greatly expands its synthetic rubber producing facilities.

"An issue of these notes dated February, 1949, told how the consumers of tires and other rubber goods here in America had saved two billion dollars in a preceeding 20-month period because our government-owned synthetic rubber plants had been kept in efficient operation," Mr. Litchfield observed.

"As I review the year ending May 1, 1951, it becomes apparent that during this period these same Americans have lost five hundred million dollars because of inefficient use of these same synthetic rubber facilities. The two billion dollar saving traced directly to the fact that sufficient synthetic rubber was being produced to prevent a runaway market in the price of natural rubber. Had there been insufficient synthetic, the price of natural rubber, then in very short supply, would undoubtedly have skyrocketed. That these big savings were real rather than theoretical is established by the reverse processes which cost American consumers a half-billion dollars in the year ending May 1."

Natural Rubber Prices

The price of natural rubber soared from an average of 18.3 cents per pound in January, 1950, to an average of 72.9 cents per pound in November of the same year, whereas 20 to 25 cents a pound would have been a reasonable and fair price, Mr. Litchfield said. The difference between what the American consumer was forced to pay for natural rubber and what he should have paid adds up to one-half billion dollars for the year, he added.

Referring to the immediate postwar years, Mr. Litchfield stated that the restraining influence of synthetic reserves and output held natural rubber to an average of around 20 cents per pound, despite short supply and increasing demand. By the close of 1949, however, synthetic plants were being gradually closed down and synthetic reserves were being depleted with a production low of 19,000 tons of GR-S type for the month of January, 1950.

"It should be noted here that the government had permitted this deterioration of the synthetic situation in the face of warnings and recommendations of the rubber industry," Mr. Litchfield recalled. "It was recommended, for instance, that a minimum synthetic stockpile of 100,000 tons be maintained along with finished inventories of sufficient size to meet suddenly expanding demands," the Goodyear executive noted.

"Some of the sources of essential raw materials needed in the production of synthetic were permitted to dry up. The closing of the synthetic plants themselves was in some instances handled in such manner as to protract and delay their subsequent reactivation."

Accelerated automobile production, consumption of gasoline and demand for rubber products of all kinds sent civilian America into the market for an unprecedented 1,259,000 long tons of new rubber in 1950, and the situation was intensified as the government started stockpiling to meet the demands for the military situation in Korea and threats to national security. With the diminished output of synthetic, "the brakes were off on natural rubber prices," he said.

Gives Thought to Future

Although the pressure currently is diminishing with the government stockpile nearing sufficiency and our synthetic plants belatedly being restored to capacity production, Mr. Litchfield cautions against any future relapses in our national rubber policy. "We are heading into even more acute trouble with rubber supply and price and the only solution is to materially expand our synthetic rubber producing facilities," he said.

Looking ahead to 1960, Mr. Litchfield predicts that the world demand for rubber will far exceed the present maximum production of 3,500,000 long tons from synthetic and natural sources. "If the rate of increase in the consumption of new rubber continues in the present decade as it has established itself in the decades since 1900, our need for new rubber in 1960 will materially exceed this available supply," he stated.

"There is good reason to believe that the world markets in 1960 could consume as much as 4,000,000 long tons. Let me point out that in 1900 Americans consumed new rubber at the rate of one pound per person yer year. In 1950 this rate of consumption had increased to 18 pounds per person.

Rubber Consumption Abroad

"Outside of this country, the current rate of consumption is one pound per person per year—exactly what we were consuming 50 years ago. More automobiles, more gasoline consumption, more new uses for rubber in America will keep our domestic demand on the upgrade. Higher standards of living outside of this country will materially increase foreign consumption of rubber."

No appreciable expansion of our potential supply of natural rubber can be hoped for, Mr. Litchfield said, pointing out that practically no planting of new rubber trees has occurred over the past 10 years. "Thus we are left with only one way out," he concluded. "Facilities for the production of synthetic rubber must be greatly expanded."

FOWLES SEES INCREASING USES FOR VINYLS IN COATED FABRICS

As government defense orders continue to mount, the vinyl industry can expect more and more vinyl resin to be utilized in coated fabrics for the armed forces, George A. Fowles, sales manager, plastics materials, B. F. Goodrich Chemical Co., said at a recent meeting of the company's domestic sales force. "Continuous development in high molecular weight vinyl resins and in compounding," said Mr. Fowles, "have overcome the objections of the military over some vinyl coated fabrics used during World War II.

"For example, mildew and tackiness were often problems in the case of ponchos used in the hot and humid South Pacific. Now, instead of applying a low molecular weight vinyl resin in an expensive solvent to a cloth backing, a modified plastisol made from a high molecular weight paste forming vinyl resin is spread on nylon twill and fused for a short time. This simplified method of applying a plastisol plus extensive research and use of proper plasticizers which will resist mildew have eliminated the undesirable features that the armed forces found objectionable during the last conflict. At the same time manufacturers have made savings by discontinuing the use of expensive solvents.

Vinyl Use in Fabric Coating

"Fabric coaters are using a good proportion of the total vinyl resin procured for defense purposes in the manufacture of poncho fabric which meets Military Specification MIL-P-3003A." According to Mr. Fowles, an important use of vinyl coated fabric is for upholstery to cover the seats on military vehicles; this is a feature that would have pleased any person who ever had to sit on the water soaked canvas seats of World War II vehicles. The new seats are covered with an embossed OD material which is a cotton duck backing coated with a paste resin compound. Specification KK-L-136B is met by this waterproof upholstery.

Mr. Fowles stated that Goodrich Chemical is also furnishing sizable quantities of vinyl resin to fabric coaters to make Arctic tent shelters meeting specification MIL-D-10709, to make label cloth under specification JAN-C-517, and for Air Force use as wing covers, engine covers, and other applications which require specification MIL-F-4143, Type III. "The armed forces also require large amounts of vinyl for wire and cable use as well as for use in barrier materials which are used for packaging articles for overseas shipment and long term stockpiling," said Mr. Fowles.

Troy Engine Names Wetherbee

Troy Engine & Machine Co. of Troy, Penna., has appointed the Wetherbee Chemical Co., 1510 South Park Ave., Buffalo 20, N. Y., as sales representatives for its Process Machinery Division in the Western New York State territory. Wetherbee Chemical will be sales representatives for the Troy line of roller mills, colloid mills, and mixers.

Leedy Heads New Department

Arthur A. Leedy

Seiberling Rubber Co., Akron, Ohio, has formed the New Projects Department, to invent or develop products the company may make in the future. The move is a step toward greater diversification of the company's production, now confined principally to tires and tubes, heels and soles, and floor mats. Arthur A. Leedy, formerly director of engineering, has been named manager of the department. He will be assisted by Alfred S. Bachtel and Henry A. Walter, both veteran Production Department employees. The "new projects" men will confine their activities to product research and will not duplicate the work of the company's Development Department. Company officials did not specify the products to be developed, but indicated that the new department might experiment in foam rubber products, mechanical rubber goods, or any of thousands of products made with rubber, synthetics or plastics.

Planning 39th Safety Congress

The National Safety Council has scheduled the 39th National Safety Congress and Exposition for Chicago, Ill., on October 8 to 12. Sessions on industrial safety will be held at the Stevens, Palmer House, Congress and Morrison Hotels. Traffic safety sessions will be held at the Congress, while commercial vehicle and farm safety sessions will be conducted at the La Salle Hotel. School safety sessions will be held at the Morrison, and home safety sessions at the Stevens. Information on the meetings may be secured from R. L. Forney, general secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Building New Plant Addition

National Rubber Machinery Co. of Akron, Ohio, is building a $100,000 addition to the welding fabricating shop of its plant at Columbiana, Ohio. The 7,200 square foot wing will be completed in late October and will enable the firm to boost production of both civilian and defense products. National Rubber Machinery now has about 300 employees but plans to take on another 50 to 75 when the new facilities are in operation.

Develops "Cold Rubber" Latex

Development of "cold" synthetic rubber latex, said to be the first to approach natural rubber latex in service and wearing quality, has been announced by the Naugatuck Chemical Division of the U. S. Rubber Co. Company officials stated that many types of synthetic rubber latex have been produced experimentally, but the new "cold" varieties are the first of the GR-S type which promise to compete with natural rubber latex in large volume applications in the rubber industry. Seven varieties of "cold rubber" latex have already been developed, indicating that synthetic latex can be tailor-made for specific applications, the company claims. For example, one variety of the new latex can be used as a 100% replacement for the natural product in the manufacture of foam sponge. Still others are said to show promise as replacements for natural latex in the manufacture of tires containing rayon tire cord, in several dipping processes, in the manufacture of sheet packing materials and brake linings. The increasing "cold rubber" expansion inaugurated by the Reconstruction Finance Corp. in government-owned plants will make increasing quantities of "cold rubber" latex available to industry, officials said.

Fleischmann Named DPA Head

Manly Fleischmann, Administrator of the National Production Authority, has also been named as Administrator of the Defense Production Administration. In effect, the appointment makes a single agency of DPA and NPA, since they now will operate under one head. An actual realignment of their functions into a single unit is still to come, however. Officials said this will be accomplished through DPA orders issued by Mr. Fleischmann. Still unsettled, however, is the exact position Mr. Fleischmann will hold in the defense production chain of command. As DPA Administrator he will be number two man and responsible only to Defense Mobilizer Charles E. Wilson. As NPA chief he is still subordinate to Secretary of Commerce Charles Sawyer.

FINANCIAL NEWS

Monroe Auto Equipment Co.

Nine Months to March 31: Net income of $549,376, which is equal to $1.29 a common share, compares with $184,143, or 33c a share in the comparable period of 1950. Net sales in the nine month period ended March 31, 1951, totaled $12,049,482, contrasted with $8,118,690 for the nine months ended March 31, 1950.

A. G. Spalding & Bros., Inc.

Six months Ended April 30: Net profit of $600,000, which is equal to $1.15 a common share, compared with $300,000, or 58c a share, a year ago. The improved earnings were attributed to larger sales, an increase in prices of about 15% and advance buying by the trade.

Boardman Named Vice-President

Clark C. Boardman

Clark C. Boardman, formerly manager of the Sterlington, La., plant of the Thermatomic Carbon Co., has been appointed a vice-president of the company. Robert W. Cretney, previously plant superintendent at Sterlington, has been named plant manager succeeding Mr. Boardman. Thermatomic Carbon Co., an affiliate of the Commercial Solvents Corp., is a producer of special types of carbon blacks. Mr. Boardman, who was formerly assistant general manager of Western United Gas and Electric Co., joined Thermatomic Carbon in 1923. He is a member of the American Society of Mechanical Engineers. Mr. Cretney, who was also associated with the Western United Gas and Electric Co., joined Thermatomic Carbon in 1923. He is a member of the American Institute of Chemical Engineers.

Alcon Changes Company Name

Alcon Products Co. of Akron, Ohio, contract tool makers for the rubber, abrasives and paper industries has changed its name to the Alcon Production Tool Co. The firm has also moved to new quarters at 579 Baird St., Akron 11, Ohio. J. E. Corbett and L. A. Conner, owners of the company, will continue to manage the firm. Production capacity of the company has been approximately doubled with the move. Alcon makes all types of slitter wheels, perforating wheels, trimmer knives, pinking wheels, circular bias cutter knives and all specials up to 12 inches O.D.

Venezuelan Agent Seeks Lines

Agencias Vimpex, sales agents with offices in Caracas, Barcelona and Maracaibo, Venezuela, is interested in taking on additional lines of rubber products for distribution throughout Venezuela. Venezuela is one of the few countries in the world where there are no controls on importations. There is also said to be no shortage of dollars for foreign trade operations. Interested companies may contact the firm by addressing H. Luehrs, Agencias Vimpex, P. O. Box 135, Caracas, Venezuela.

3M Approves New Amendments

Foreign and domestic subsidiaries of the Minnesota Mining & Manufacturing Co. will be given greater freedom of operations, particularly in matters of financing, as a result of actions taken on June 14 by stockholders and debenture holders of the parent company meeting in St. Paul, Minn. The stockholders approved three amendments to the certificate of incorporation. Debenture holders approved similar amendments to the indenture of 1947 under which the company issued $10,000,000 in bonds.

One effect of the amendments is to give foreign subsidiaries freedom to finance themselves directly through local borrowing and issuance of stock rather than obtaining American dollars from the parent company. The amendments also permit the parent company to increase its guarantee of domestic subsidiary debts from $1,000,000 to $5,000,000, and to raise from $2,000,000 to $5,000,000 the aggregate maximum amount of funded debt or debt for money borrowed which may be incurred or assumed by domestic subsidiaries.

The changes in regulations governing foreign subsidiary operations were made necessary by recent changes in 3M methods of conducting foreign business. Until April 30, 1951, the company operated in foreign markets through minority holdings in the Durex Abrasives Corp., an exporting company, and the Durex Corp., which operated manufacturing plants in Germany, England, Canada, Australia and Brazil, and a merchandising plant in Argentina. Since then, 3M has purchased 84% of the stock of Durex's British subsidiary and all the stock of the Brazilian and Argentine subsidiaries. It has also acquired control of the non-abrasive assets of Durex's German and Canadian subsidiaries, acquired control of Durex Abrasive's Mexican subsidiary and agreed to purchase that firm's French subsidiary.

Scott Testers Elects Officers

David C. Scott, Jr., has been elected president of Scott Testers, Inc., Providence, R. I., succeeding his father, the late David C. Scott, Sr. In addition to serving as president, Mr. Scott continues as sales manager of the company. James M. Scott continues as treasurer and production manager of the company. Diana Scott Worthington has been elected secretary, while William G. Ahlson, formerly company accountant, has been named assistant treasurer. Other executive personnel remain as before: Harry W. Norton, general sales engineer; Harold R. Rasmussen, in charge of sales and research and development of the Mooney Viscometer Division; Enoch B. Bolton, factory superintendent; and Robert W. Rogers, chief engineer.

New Vinyl Floor Coverings

Congoleum-Nairn Inc., Kearny, N. J., has introduced a new line of vinyl plastic floor coverings. The new vinyl plastic yard goods come in marbelized patterns in correlated colors.

VINYL SPECIALTIES

Frank & Sadey, 330 Fifth Ave., New York 1, N. Y., are producing reversible Vinylite tablecloths which are said to have the three-dimensional feel and appearance of a fine woven fabric. One side has a printed plaid effect, while the other side looks and feels like not only a different fabric weave but also has a solid contrasting color.

New shower curtains and matching bathroom window curtains made of Vinylite plastic which combine the weightiness of tapestry and feel of facile, are being manufactured by Kerk Guild, Inc., Whitesboro, N. Y. Both curtains are trimmed with 3-inch panels of "Sealtuft," the stitchless, quilted Vinylite.

A new roll-up type tobacco pouch which incorporates five chambers in the flap designed to hold normal-sized pipe cleaners is being made of Vinylite plastic by Korey Products, 250 West Broadway, New York, N. Y.

Michael Lamp Shade Corp., 39 East 12th St., New York 3, N. Y., is producing lampshades that are said to look and feel like fine silk but which are covered with textured Vinylite plastic film. The shades are available in a variety of shapes and sizes for all types of table and floor lamps.

A new crab trap made of wire mesh coated with brightly colored Vinylite resins is being manufactured by the Washburn Co., Worcester 8, Mass. The resin coating makes the trap clearly visible under water, adds weight to the trap to make it sink more rapidly, bonds the wire joints, and also adds strength and longer life to the metal trap.

Chemical fumigation of the soil has now been facilitated with the introduction of a 4-gauge vinyl film seed-bed cover called "Fumi-Cover". Made of Velon, the cover is gas-tight and permits the effective use of methyl bromide for the complete elimination of weeds, as well as control of nematodes and other soil pests.

Renick Boggs & Co., Chicago, Ill., is manufacturing a new line of raincoats made of a specially processed Vinylite plastic with the look and feel of fine taffeta. A new process of embossing the plastic film lends to its luxurious appearance and makes it wrinkle-resistant.

A versatile new doll's facial expression can be changed from laughing to crying or sleeping almost as quickly as a live baby's. The doll's head, with three separate faces, is molded of soft Vinylite resins that feel remarkably like human skin. The doll is produced by Ideal Toy Corp., New York, N. Y.

Made of Vinylite plastic film, a new swimming pool cover manufactured by the Krohome Industries, Del Amigo Road, Danville, Calif., is said to cut pool maintenance costs and to provide an excellent barrier for keeping falling leaves and dirt from entering the pool.

NPA Rubber Advisory Committee

The National Production Authority, U. S. Department of Commerce, has announced the latest membership list of the Rubber Industry Advisory Committee. Members of the committee include: F. D. Hendrickson (American Hard Rubber); James A. Walsh (Armstrong Rubber); R. E. Drake (Avon Sole); Charles H. Baker (Charles H. Baker); John M. Bierer (Boston Woven Hose); Furber Marshall (Carlisle Corp.); A. L. Freedlander (Dayton Rubber); O. G. Vinnedge (Dryden Rubber); E. B. Germain (Dunlop Tire); Harvey S. Firestone, Jr. (Firestone); Charles C. Gates, Jr. (Gates Rubber); W. F. O'Neil (General Tire); John L. Collyer (Goodrich); P. W. Litchfield (Goodyear); Thomas Robins, Jr. (Hewitt-Robins); W. Q. Heinze (International Latex); R. G. Landers (Landers Corp.); A. G. Garthwaite (Lee Tire); Harry McCreary (McCreary Tire); H. E. Smith (Raybestos-Manhattan); F. Thatcher Lane (Seamless Rubber); J. P. Seiberling (Seiberling Rubber); Everett Morss (Simplex Wire); H. E. Humphreys (U. S. Rubber); Jean H. Nesbit (U. S. Rubber Reclaiming); W. D. Voit (W. J. Voit); and Donald F. Pratt (Durkee-Atwood).

Utility of Water-Filled Tires

Substantial increases in tire life and lowered operating costs for tires used in underground mining may be accomplished through substitution of 100% water filling for the conventional air pressure method, according to the Goodyear Tire & Rubber Co. Running at low speeds (less than 5 mph), use of the 100% water filling permits adequate pressure to be maintained constantly until the tire is worn out or punctured, tests disclose. In a 100% water-filled tire, internal pressure varies with the load, giving minimum pressure when the load is light and increased pressure as the load increases. This keeps the flexing of the tire within reasonable limits, reducing cord fatigue in the sidewalls. Goodyear developed the plan for filling tires with liquid many years ago, under the name "Solution 100," an idea in wide use to improve the performance of farm tractors operating on pneumatic tires. Company engineers later approved the extension of the method to include industrial tractors and power graders. Recommendation that mine companies use water filling in mine car shuttle tires is said to be the first approval of this plan for tires on load carrying vehicles.

Delmonte Forms Consulting Firm

John Delmonte, nationally recognized authority on many phases of the plastics industry, has established a full time consulting and research service with headquarters in Glendale, Calif. Mr. Delmonte, who has for some years engaged in consulting work on a limited basis, has resigned his positions with the Plastics Industries Technical Institute and West Coast University to devote his full time to the new enterprise.

AIRCRAFT TIRE DESIGN MAKING PROGRESS SINCE WORLD WAR II

Airplane tires used on World War II combat aircraft could not get today's faster, heavier jet fighters and bombers off the ground—let alone land them safely. Today's military airplane tires must support heavier weights, operate at faster ground speeds and withstand higher inflation pressures than were dreamed of in World War II, according to T. G. Graham, vice-president of the B. F. Goodrich Co. Mr. Graham said Goodrich has continued research and development work on airplane tires just as if World War II had never ended. As a result, tire designs which did a good job on military aircraft only half a dozen years ago are now obsolete.

"In World War II, the heaviest load supported by airplane tires was the 35,000 pounds resting on each tire of the B-29," the Goodrich executive said. "Massive, new jet bombers need tires strong enough to support 60,000 pounds each. New designs, new methods and new rubber compounds produced such tires." New rubber compounds which resist destructive internal heat build-up at high takeoff speeds had to be developed before latest jet planes could get into the air, Mr. Graham said. Tires used on World War II aircraft could not survive high takeoff speeds now common.

Take-Off Speed Increases

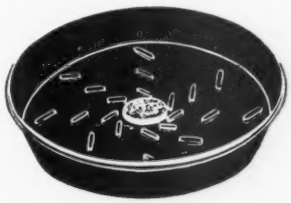
Mr. Graham said the average take-off speed of jet bombers is up 50 per cent over that of heavy bombers of World War II. Some jet fighters reach 200 miles per hour on take-off as compared with the 120 mile average of World War II fighters. One project has reached take-off speed of 220 miles per hour. Only a special rubber compound makes such speeds possible. Another postwar development—the extra high pressure airplane tire, featuring a small cross-section with large diameter—made it possible for airplanes to fly faster than the speed of sound, Mr. Graham said.

To slice through the sonic barrier, airplanes need a thin wing, Mr. Graham explained. Conventional tires could not fold into such a narrow wing, as they must do in flight. According to Mr. Graham, a new tire developed to solve the problem takes inflation pressures up to 300 pounds per square inch and fits into the thin wing of jet tactical aircraft. World War II posed no similar problem, he said, since no plane used in that war could fly faster than sound and thin wings were not a design requirement for aircraft.

Pointing to important advances made in compounding rubber for special purposes, Mr. Graham said that all airplane tires made now withstand cold temperatures to —65°F. At that temperature, rubber compounds known early in World War II would break and shatter like glass when undergoing laboratory impact tests. The new "cold weather" tires remain flexible at low temperatures and do not develop flat spots when supporting the weight of the plane.

"Plantray" Flower Pot Saucer

Central Rubber Products Co., Inc., 821 Broadway, New York 3, N. Y., has introduced the "Moist-Shur Plantray", a rubber tray designed to be used under Jardiniers and vases as well as flower pots. The tray features a sunken bottom



which collects overflow water in the center. Here, an absorbent pad feeds this water back to the roots of the plant through the normal opening in the bottom of the flower pot. Furnished in various colors, they trays are available in four sizes, 5⅛, 7⅝, 10⅜ and 12¼ inches.

Battelle Constructing New Laboratory

Battelle Memorial Institute, Columbus, Ohio, has begun construction on its new $1,000,000 laboratory building. The new laboratory, according to Institute officials, results from increased demands for research services on behalf of the nation's defense effort. The construction has been approved by the National Production Authority as a result of endorsement by military and other government agencies. The new construction will be the Institute's fifth in the past decade. A three-story structure with two bays for pilot plant operations, the new building will provide approximately 80,000 square feet of work area and will house 115 unit laboratories. Currently, Battelle's research volume surpasses $8,000,000 annually and includes important defense studies for the Atomic Energy Commission and the military services. It is expected that the new building will allow a 15 to 20% increase in Battelle research services.

Goodyear Establishes Paint Laboratory

Increased demands for high styrene-butadiene copolymers for specialized uses by the nation's paint producers have prompted the establishment of a special paint development laboratory within the Chemical Division of the Goodyear Tire & Rubber Co. at Akron, Ohio. The new laboratory will be headed by J. J. O'Neill who has had some ten years' experience in the paint industry as a research and development chemist with special emphasis on the formulation of industrial and marine finishes. A graduate of Drexel Institute of Technology with a degree in chemical engineering, Mr. O'Neill will devote most of his time to further refinements and uses for Pliolite S-5, Goodyear's synthetic material which finds use in the paint industry in the formulation of chemical resistant finishes. Mr. O'Neill is the holder of several patents on the development of petroleum resins.

MARINE INSTITUTE REPORTS ON U. S. NATURAL RUBBER IMPORTS

According to the American Merchant Marine Institute of New York, N. Y., rubber, our number one import before World War II, continues to be a most important commodity that must keep flowing to this country to meet expanding demands of both industry and national defense. Record domestic consumption plus a large stockpiling program makes the steady importation of rubber one of the most vital tasks assigned to American Shipping the Institute says.

Natural rubber is reaching the United States at a rate of 92,800 tons a month, a peace-time record and some 130% above the pre-war average. A stepped-up stockpiling program is largely responsible for the great influx in 1951. It is estimated that our stockpile of rubber totals 600,000 tons, enough to sustain a global war for five years.

In a recent month this year, 75 ships carrying rubber came to the United States, or better than two a day. As most of the rubber-processing plants are in the East, New York, Philadelphia, Baltimore, Boston and Fall River handled the major portion, with other shipments going to Mobile, New Orleans, Galveston, Houston, and San Francisco.

Source of Rubber Supply

Almost all of the world's supply of natural rubber is located in the rich Far East area with Malaya sending us almost 50% of our imports. Other prime sources are Indonesia, 17%; Thailand, 12%; Ceylon, 7%; and French Indo-China, 5%. Lesser amounts come from Brazil, West Africa, Peru and Mexico. The principal rubber shipping ports are Port Swettenham, Penang, and Singapore in Malaya, Tandjong Priok and Belawan Deli, Indonesia, and Colombo, Ceylon, with considerable rubber reaching this country by trans-shipment via Rotterdam.

But the demand for rubber is so great that ships go to any port that has it and such little heard of ports as Duala, French Cameroons; Matadi, Belgian Congo; Accra, Gold Coast; Burutu and Calabar, Nigeria; Kuching, Sarawak, and Coalzacoalcos, Mexico, are visited.

Rubber is prepared for shipment by securing together a number of sheets in bales weighing 250 to 300 pounds each. It is necessary to stow these bales carefully in the hold of a ship and a great quantity of talcum powder and copra mats is used to seal the bales from moisture and condensation. Latex, another essential import for rubber stockpiling, is shipped in drums carried on the decks of freighters, or in the vessels' deep tanks.

Aluminum Co. of America, Pittsburgh, Penna., has prepared for free distribution a 14-page illustrated booklet on its East St. Louis, Ill., research laboratory. Besides describing the facilities, the booklet tells the aim and scope of the research program at the laboratory and the nature of the many products that the Aluminum Ore Co. offers industry.

ADDITIONAL TECHNICAL PUBLICATIONS OF BRPRA MADE AVAILABLE

Abstracts of some of the recent publications issued by the British Rubber Producers' Research Association are published from time-to-time in RUBBER AGE. These booklets, which cover research work conducted by various members of the BRPRA staff, may be secured by writing the Association at 19 Fenchurch Street, London, E. C. 3, England. Abstracts of some of the more recent publications follow:

The Electron Pairing Theory of the Structure of Conjugated Hydrocarbons, by W. Moffitt. (Publication No. 124): The electron pairing theory of molecular structure has been extended in its application to conjugated hydrocarbons. Formulae for calculating internuclear distances, force constants and interaction constants are derived. These appear to give rather better results than the already successful molecular orbital theory. The interaction of two conjugated systems is discussed, and it is shown how the conjugating power of a hydrocarbon residue may be correlated with its residual affinity.

Rubber Physics Applied to Engineering Problems, by L. R. G. Treloar. (Publication No. 125): The principal results of the mathematical theory of elasticity which has recently been developed, particularly by Rivlin, are here presented in a readable manner for those interested in the design of engineering components and allied problems.

The Thermal and Photo Oxidation of Some Non-Conjugated Olefins, by L. Bateman and J. L. Bolland. (Publication No. 126): This paper discusses the free radical chain mechanism of the reaction between oxygen and non-conjugated olefins, and collates the different features associated with different catalytic conditions. After pointing out general relationships between oxidizability and chemical structure, particular reference is made to the polyisoprenes, where the basic mechanism is modified in a unique way. Finally, the function of antioxidants is considered, and the mode of action of phenolic and hydroquinone type compounds detailed.

An Infra-Red Spectroscopic Investigation of Double-Bond Structure in Simple Acyclic Terpenes and Derivatives Thereof, by D. Barnard, L. Bateman, A. J. Harding, H. P. Koch, N. Sheppard and G.B.B.M. Sutherland. (Publication No. 127): A comprehensive infra-red spectroscopic examination of open-chain monoterpenes and derivatives reveals that the correlations between absorption characteristics and structure found in simpler hydrocarbons apply equally in the wider field. One important conclusion illustrating the diagnostic power of the infra-red technique is that the long-standing controversy as to whether such natural terpenes consist of isomers having the end-groups $CMe_2 = C<$ and $CMe\text{-}CH (= CH_2)$ — is resolved in favor of the view that they are homogeneous substances possessing the former grouping.

The Reaction of Oct-1-ene with N-Bromosuccinimide, by L. Bateman and J. I. Cunneen. (Publication No. 128): The investigation described in Publication 129 is extended to a Δ^1-mono-olefin where the spectroscopic findings are responsive to quite unambiguous and more accurate interpretation. Previous conclusions concerning the isomerization proceeding during the reaction are substantiated, and attention is directed towards important factors which decide the isomeric nature of the products obtained from olefinic substitutive reactions.

The Reaction of Hexa-1:5-diene with N-Bromosuccinimide, by L. Bateman, J. I. Cunneen, Joyce M. Fabian and H. P. Koch. (Publication No. 129): The double bond displacements occurring in hexa-1:5-diene on substitutive bromination are examined. Spectroscopic methods, particularly infra-red, are shown to provide powerful support to conclusions as to the specific structural courses followed by certain chemical transformations. The results accord with present theories of olefinic reactivity.

Experiments Relating to the Synthesis of Homogeranic Acid, by D. Barnard and L. Bateman. (Publication No. 130): The conversion of geranic acid into the next higher homologue (homogeranic acid) only proved possible in poor yields by the methods hitherto available. A new synthetic route is described which furnishes this acid in good yield and is shown to be generally applicable in analogous processes.

Some Reactions of Geranylmagnesium Chloride, by D. Barnard and L. Bateman. (Publication No. 131): The Grignard compound from geranyl chloride is converted into isohomogeranic acid, in conformity with the similar isomerizations found for simple allylic halides. A by-product proved to be a hydrocarbon mixture of two isomers formed by the coupling of two geranyl fragments. The nature of these products is discussed in the light of recent developments in the chemistry of allylic compounds.

The Equilibrium Swelling of Cross-Linked Amorphous Polymers, by L. R. G. Treloar. (Publication No. 132): This paper extends the theory of the swelling of a vulcanized rubber under strain, developed by Flory, to the case of a 3-dimensional strain of any type. The equilibrium swelling (in suitable solvents) should increase for extension, and decrease for compression of the rubber, while for shear there should be little change.

Goodrich Tire for Corn Planters

A new special tire for corn planters, said to embody one of the most novel designs ever included in a pneumatic casing, has been announced by the B. F. Goodrich Co., Akron, Ohio. The tire, which tests have shown will do a more efficient job than the steel wheels which have been standard equipment on planters, is constructed with high shoulders and lower center. It retains that shape when inflated to the recommended pressure of

from 4 to 8 pounds, depending on condition of the soil on which it is employed. The steel wheel conventionally used on planters is fashioned so that its two outer rings press the soil into the furrow after the seed has been dropped. When the planter is worked in moist soil, these wheels build up soil on their surfaces resulting in inadequate and uneven covering for the seed. It was primarily to correct this condition that Goodrich engineers designed the new tire which can be used on both wet and dry soil with good results. The new special planter tire is mounted on a standard drop center rim on a lightweight wheel specially developed for this purpose.

Meteorological Balloon Project

Development of the first free-flight meteorological sounding balloon capable of rising 150,000 feet, or about 30 miles, is the objective of a two-year research program just instituted by the Dewey & Almy Chemical Co., Cambridge, Mass., under contract to the Signal Corps. Fully expanded, this balloon is expected to measure approximately 130 feet in diameter. No natural or man-made device, with the exception of giant rockets, has ever reached this height, the company stated. Present record of 136,000 feet or about 26 miles was set with a Dewey & Almy balloon on October 4, 1950. Specifications of the contract call for a balloon able to lift to the 30 mile altitude a five pound load of instruments for studying cosmic rays and atmspheric conditions. Dewey & Almy sounding balloons are made by the dip rubber process.

Marion Named Research Chemist

Richard L. Marion

Sun Rubber Co., Barberton, Ohio, has appointed Richard L. Marion as research chemist of the company. A specialist in the application of chemistry to industrial production, Mr. Marion will be primarily concerned with coordinating the work of Sun Rubber's laboratory with manufacturing operations in the development of new processes and improvement of existing techniques. Mr. Marion comes to Sun Rubber from Fenn College in Cleveland, where he served as instructor in chemical engineering for the past four years. He holds a B. S. degree in chemical engineering from Purdue University and has completed six years of graduate study at Buffalo University and Case Institute of Technology. He is scheduled to receive his master's degree in chemical engineering at Case in the near future, and then plans to work on a Ph. D. His background also includes two years as senior research engineer with the National Aniline Division of the Allied Chemical & Dye Corp. at Buffalo, N. Y. He is the son of the late Louis F. Marion, a pioneer in Sun Rubber's development and an administrative leader with the company for almost 25 years until his death in 1948.

Reorganizes Sales Department

In a move designed to meet the growing use of its products, the American Wheelabrator & Equipment Corp., Mishawaka, Ind., has reorganized and expanded its sales staff at the executive level. L. L. Andrus, formerly vice-president in charge of sales, has been named vice-president and executive head of the Dust and Fume Division. John A. Silver, formerly with Lester and Silver of New York and Philadelphia, has been named director of sales. E. B. Rich, previously Chicago representative of the company, has been appointed general sales manager. A. E. Lenhard, advertising and sales promotion manager, has assumed new responsibilities. S. S. Deputy, sales manager, will work closely with the general sales manager on special assignments. Bernard Lester, of Lester and Silver, will continue as sales management consultant to the Sales Division and to general management of American Wheelabrator.

LOS ANGELES NEWS

Approximately 45 members and guests of the Los Angeles Rubber Group participated in a golf tournament held on May 18 at the Riviera Country Club. Winners of the different events included: *Blind Bogey*, Skip McMahon (Cardox); *Low Net*, Bill Michalak (Plastic & Rubber Products); *Least Putts*, Bob Johnson (Rubber Products); *Low Gross*, Bill Penfield (Firestone); *Closest Tee Shot*, Al Pickard (Braun); *Longest Drive*, Alex Siamas (Rubber Teck); *Longest Putt*, Al Federico (C. P. Hall); *Most Traps*, Tway Andrews (H. M. Royal).

On May 19, approximately 25 members and guests of the group went on a fishing trip. Bill Burnell (Goodyear) won first prize, a jackpot of $23 and a fishing pole. Jack Knudson and Ernest Brazil tied for second place. Mr. Brazil won the toss of a coin and took home 300 yards of nylon fishing line.

Goodyear Tire & Rubber Co. has opened a new $1,000,000 factory wing at its local plant for the production of Airfoam. The 75,000-square foot wing will house about 100 workers and will be equipped with three parallel Airfoam units, two of which will be used in production of Airfoam for automotive seating, while the third will produce the product for furniture cushions, back and arm rests and miscellaneous items.

The company now has under construction on a City of Los Angeles pier, six tanks for loading and storing of latex brought from Goodyear plantations in Sumatra and Malaya. The tanks have a total capacity of 156,000 gallons.

Arrowhead Rubber Co. has leased and is rebuilding a 27,000 square foot building in Long Beach, Calif., to house its Ducting Division. The move to the new building began on July 1.

Interstate Rubber Products Co. has moved to a new plant at 908 Avilla St. in Los Angeles.

Standards for V-Belt Drives

The Rubber Manufacturers Association, Inc., and the Multiple V-Belt Drive & Mechanical Power Transmission Association have announced the completion and issuance of a 16-page manual of recommended "Engineering Standards for Multiple V-Belt Drives", as developed and approved by the technical committees of both associations. The data in the manual is based on the latest engineering opinion and research. It indicates the proper sheaves and belts to be used for the attainment of optimum efficiency and economy of the complete drive in relation to the particular duty required. The standards may be obtained at a cost of $1.00 from either the Multiple V-Belt Drive Association, 7 West Madison St., Chicago 2, Ill., or the Rubber Manufacturers Association, Inc., 444 Madison Ave., New York 22, N. Y.

Dewey & Almy Appoints Bare

Bruce M. Bare

Dewey & Almy Chemical Co., Cambridge, Mass., has appointed Bruce M. Bare as sales manager of the Organic Chemicals Division. Before coming to Dewey & Almy, Mr. Bare was Chicago district sales manager for Sharples Chemicals Inc., where he worked with sales and development of chemicals used in the manufacture of industrial coatings, synthetic resins, pharmaceuticals, detergents, demulsifiers and other products related to the organic chemicals industry. With Sharples since 1948, he was previously with E. I. du Pont de Nemours where he did research on lacquers and lacquer solvents. A graduate of Gettysburg College, Mr. Bare was chairman of the Chicago Chapter of the American Institute of Chemists, and is a member of the New York Chemist's Club, the American Chemical Society, and the Chicago Drug and Chemical Association.

To Double Paracril Production

Naugatuck Chemical Division of the U. S. Rubber Co. has announced a major expansion program aimed at doubling the production of its Baton Rouge, La., Paracril synthetic rubber plant. Plans call for the construction of a new administration building, laboratory, and gate house, as well as new reactors, drying units and other production equipment. New warehousing and latex storage facilities will also be added. The expansion program will bring plant capacity for the production of Paracril nitrile rubber, Nitrex latex, high styrene latex and high styrene resins to approximately 30,000,000 pounds annually. The expansion will be completed by early 1952, the company stated.

Lanolin Alcohols Available

Croda, Inc., 51 Madison Ave., New York, N. Y., has announced the availability of lanolin alcohols (wool wax alcohols) in bulk quantities for prompt delivery. The company states that it is also able to make prompt delivery of a full line of lanolin and lanolin derivatives from domestic production.

NEW RUBBER GOODS

Goodyear "Toy Soldier" Balloon

The "toy soldier" balloon depicted herewith, constructed by the Goodyear Tire & Rubber Co., Akron, Ohio, appeared in the annual Thanksgiving Day Parade sponsored by R. H. Macy & Co. in New York City. The photograph shows the comic

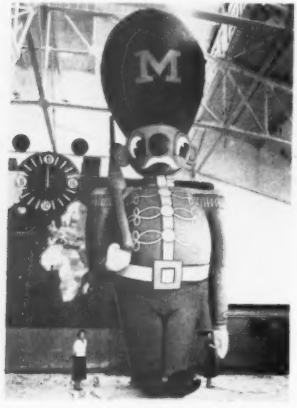
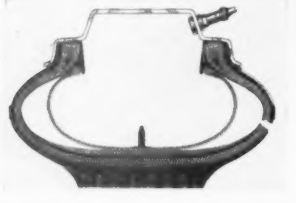


figure inflated to full size at the Goodyear Gym in Akron, prior to shipment to New York for the parade. The "soldier" is one of the number of huge comic balloon figures built by Goodyear over a 22-year period, with the exception of the war years, for the New York firm. In the parade, helium is used to inflate the giant figures which float high above the Thanksgiving Day crowds.

Firestone Puncture-Proof Tire

As reported in recent editions of RUBBER AGE, the Firestone Tire & Rubber Co. has announced the development of what is said to be the world's first puncture-proof tubeless tire. Pictured below is a cross-section of this tire. The tire is shown as it supports the car after a blow-out. The inner



diaphragm retains the bulk of the air after the blow-out to make the tire easily controllable at all speeds. The small valve automatically closes and retains the air in the inner diaphragm in event of a blow-out. Under normal driving, and during inflation of the tire, the valve remains open to maintain equal pressure through all parts of the tire.

Carborundum "61" Contact Wheel

An entirely new type of contact wheel for abrasive belt application on backstand idler applications of many types in the metal working field was recently announced by the Carborundum Co., Niagara Falls, N. Y. The result of more than three years of development and research, the new "61"

wheel is a specially-serrated rubber wheel that causes a controlled breakdown in the bond of the abrasive belt. The result is that glazing, long the enemy of prolonged and productive belt life, is reduced to such a great degree that belt life is doubled. While the idea of a rubber serrated contact wheel is not new, the unique characteristics of the new wheel—the relief angle, wide-spaced lands, narrowness of the lands, which are based largely on the design of milling cutters—are entirely new developments, and are responsible for the increase in belt life and cutting rates.

"3M" Rubber Sanding Block

Minnesota Mining & Manufacturing Co., St. Paul, Minn., has announced the availability of an all-rubber hand sanding block. Named the "3M" Brand Sanding Block, the new rubber block is designed for use

with 2¾ by 9-inch sheets of pre-cut home workshop sandpaper. It can be used for both dry and wet sanding. The sandpaper is held firmly in place by three spikes set under flexible rubber flaps at each end of the block. The solid rubber block is said to have the right combination of flexibility and rigidity so that it sands a flat surface smoothly without either gouging or glazing.

Lord Flexible Couplings

Lord Manufacturing Co., Erie, Penna., has developed a new line of flexible couplings of particular interest to manufacturers of electrical appliances for home use, office machinery, and other motor-driven equipment which requires the use of electrical motors with ratings up to ½ hp at 1750 rpm. It is claimed that the new coupling design reduces operating noise, absorbs torsional shaft vibration, and accommodates shaft misalignments of as

much as 2° angular and 1/32-inch parallel. Hubs stamped from steel strip stock replace the customary machined or die cast type. Oil resistant neoprene is permanently bonded between two flanged hubs to produce a one-piece design which is easier to handle and assemble into machines. Since the neoprene is stressed in shear, maximum torsional flexibility is obtained to absorb momentary irregularities of shaft speed, and thus provides smoother power transmission. Another design feature is the unique method of shaft attachment which completely eliminates the need for keyways, pins and set screws. Installation requires only that the coupling hubs be slid onto the shafts. Because both shafts are free to move longitudinally within the hubs, normal shaft end play is readily accommodated, the company stated.

Goodrich Rubber Radar Dome

An inflated rubber radar dome, capable of withstanding 120 mile an hour winds as well as heavy accumulations of ice and snow, has been developed by the B. F. Goodrich Co. for the U. S. Air Force. The pumpkin-like structure stands 37 feet high and will be used to house aircraft warning equipment being installed in the Arctic regions of the North American continent. The radar dome is 54 feet in diameter, contains 60,000 cubic feet of space and requires over 1,200 pounds of synthetic rubber and 90 gallons of rubber cement. The thin walls are constructed of a specially compounded rubber and fiber glass and are inflated with less than one pound of air pressure per square inch. Nylon and rayon fabric will be used in other domes. The domes are said to prevent the delicate radar equipment from icing while permitting clear reception of signals without distortion.

THE STORY BEHIND THE WORD...

JADE...

The early Spanish explorers who discovered Jade in America called it "piedra de ijada" or "stone of the side." For they thought it had powers to cure the colic or pain in the side. The French borrowed the word, changing it to le jade. *The English took the last half of this and hence our American word for the stone discovered in America is "jade."*

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CANADIAN NEWS

The development and commercial production of a new type of synthetic rubber for general purpose use has been announced by the Polymer Corp. This material, which is known as Polysar Krynol, is the outcome of approximately a year of research and cooperative effort between Polymer and the General Tire & Rubber Co. For the first time, the new rubber is being made available to the Canadian rubber industry in commercial quantities.

According to the Polymer announcement, the basic principle involved in the new development is the use of a high quality synthetic copolymer, which would be too tough to process in standard rubber plant equipment, in conjunction with rubber processing additives to yield a product which is indistinguishable in appearance from ordinary raw rubber "and which has the correct balance of quality and processability required for commercial utilization."

The development was said to mark a new era in synthetic rubber manufacture, since it permits a 20 to 25% increase in production of rubber from the critical raw materials which are currently in short supply. It also opens up the possibility of a wide range of new types of rubber for special purposes, since the characteristics of both the parent rubber and the additives can be varied at will.

At the present time Polysar Krynol is available in limited quantities only for laboratory and factory evaluation and only with a staining antioxidant. It is expected, however, that a non-staining type will be made available in the near future. Availability of increasing quantities of the new rubber must await the completion of new plant facilities. The experimental price of the material is 24.5 cents per pound, f.o.b. Sarnia plus equalized freight. All shipments must be against allocations.

Polymer Corp., Ltd., Sarnia, Ont., has reported a net profit of $4,151,710 in the fiscal year ended March 31, 1951. Net profit in the previous fiscal year was $843,660. Net sales in the 1951 fiscal year totaled $35,293,479, or $9,000,000 more than in the fiscal year ended March 31, 1950. Of the 1951 profits, $4,108,363 has been transferred to the surplus fund. The report also stated that the Canadian government has now been paid back $13,491,355 of the original $50,000,000 outlay, including payments of $1,886,297 last June and $3,000,000 in April of this year.

The Sarnia plant is now undergoing a $10,000,000 expansion program. Research equipment obtained through the allied control authorities in Germany is now being installed. The corporation's research program is being directed toward improving utilization of feed stocks, increasing production rates and developing substitutes for chemicals in short supply.

At the annual meeting of the board of directors held on June 8, D. D. Barrington was appointed president and managing director of the Polymer Corp., with headquarters at Sarnia. Mr. Barrington, president of Light Alloys, Ltd., and vice-president and general manager of Dominion Magnesium, Ltd., succeeds E. J. Brunning, the corporation's president since 1946. Mr. Brunning will continue as chairman of the board.

E. R. Rowzee, formerly manager of the plant, has been elected vice-president succeeding J. R. Nicholson, who resigned. Mr. Nicholson, who was with the plant since its founding in 1942, was executive vice-president and managing director. He is taking an appointment with another corporation. L. D. Dougan has been appointed plant manager, with direct responsibility for co-ordination of production and plant operation. J. W. Henly has been named personnel manager and a member of the company's Management Committee.

The Goodyear Tire & Rubber Co. plant at New Toronto, Ont., was recently idled as 2,100 employees continued their walkout in support of wage increase demands of 25c an hour. Negotiations between company and union officials were stalemated and both sides held little hope for an early settlement. Some 1,100 employees also struck the Bowmanville, Ont., plant. New Toronto workers voted unanimously to stay off the job until the company moves toward a "reasonable settlement." Before negotiations broke down, the company's final offer was an increase of 8.7c per hour.

One of Canada's most outstanding nuclear chemists, Dr. H. G. Thode, of Hamilton, Ont., was elected president of the Chemical Institute of Canada for 1951-1952 at its 34th Annual Conference held on June 18-20 at the Fort Garry Hotel in Winnipeg. Dr. Thode is Principal of Hamilton College of McMaster University and is also head of the University's Department of Chemistry.

Dr. Robert Stephen Jane was elected vice-president of the C.I.C. Dr. Jane is vice-president in charge of research and development and also a director of Shawinigan Chemicals, Ltd., Montreal, and is a director of Shawinigan Resins Corp., Springfield, Mass., and Canadian Resins and Chemicals, Ltd., Montreal.

At the meeting, four prominent Canadian chemists were elected to Fellowship in the C.I.C. The four new Fellows are: Dr. N. H. Grace, biochemist, Division of Applied Biology, National Research Council, Ottawa; Dr. Richard H. Manske, director of research, Dominion Rubber Co., Ltd., Guelph, Ont.; Dr. Norman W. F. Phillips, head of the Electrometallurgical Div., Aluminum Laboratories, Ltd., Arvida, Que.; and Dr. Elwood V. White, professor of chemistry, University of British Columbia, Vancouver.

The Rubber Association of Canada has expressed some concern regarding current imports of Czechoslovak footwear and Japanese toys which, according to Greig B. Smith, association manager, are being imported "at prices well below Canadian manufacturing costs." Mr. Smith pointed out that reduction of Canadian duties on rubber products on June 6 as a result of the Torquay agreements will likely step up the flow of such imports. Imports of rubber goods into Canada last year set a record of $14,543,000, while exports from Canada, valued at $12,153,000, were slightly below those of 1949.

Canadian Industries, Ltd., has announced that it will erect a new plant at Copper Cliff, Ontario, to produce liquid sulfur dioxide from by-product gases arising from the operation of the oxygen flash smelting process recently developed by the International Nickel Co. When completed, the plant is expected to produce approximately 90,000 tons of liquid sulfur dioxide per year.

The Fabrikoid Division of Canadian Industries, Ltd., expects to start construction of a $1,000,000 addition to its New Toronto, Ont., plant shortly. The growing demand for vinyl coated fabrics is taxing the company's existing plastic processing facilities to capacity. The new addition will house the latest equipment for producing these products.

A contract for a $1,000,000 carbon black plant to be built at Sarnia, Ont., has been let by Godfrey L. Cabot, Inc., to Stone & Webster, (Canada), Ltd. Cabot officials said the work was scheduled to begin early this summer.

Advance Solvents Reference Chart

A new, revised handy reference chart listing the many products of the Advance Solvents & Chemical Corp. for the protective coatings industry has just been published by the company. Listing the various types of driers, stabilizers, plasticizers, paint specialties, tackifiers, wood preservatives and emulsifiers available, the chart is designed for quick reference by chemists, production men and others. The descriptions for each product include specifications, applications, formulations and other laboratory data. The chart is available free of charge from the company at 245 Fifth Ave., New York 16, N. Y.

Plan French Chemical Exposition

"Chimie & Industrie," the French trade publication serving the chemical industry, is arranging an exposition featuring the results of chemical activities of France in comparison with other countries. Scheduled to begin on November 22, in Paris, the exhibit will also feature the 7th Exposition on Laboratory Materials and Industrial Controls, and the 24th International Congress on Industrial Chemistry. Information on the exhibition may be secured from the General Commissary of the Chemical Exhibition, 29 Rue St. Dominique, Paris 7, France.

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SANTOFLEX BX—A preferred antioxidant for retarding oxidation and flex cracking. It mildly activates accelerators of the thiazole type. Use not over 2.0% to avoid blooming.

SANTOFLEX 35—The choice of many manufacturers for retarding oxidation and flex cracking. It mildly activates thiazole-type accelerators. Blooming can be avoided by using not over 1.0%.

For technical information on these and other Monsanto Chemicals for the Rubber Industry, contact MONSANTO CHEMICAL COMPANY, Rubber Service Department, 920 Brown Street, Akron 11, Ohio.

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Santoflex 35
Santoflex AW
Santowhite® Crystals
Santowhite MK
Santowhite L

ALDEHYDE AMINE ACCELERATORS

A-32
A-77®
A-100

MERCAPTO ACCELERATORS

Santocure®
El-Sixty®
Ureka® C
Ureka Base
Mertax (Purified Thiotax)
Thiotax (2-Mercapto benzothiazole)
Thiofide® (2,2′ dithio-bis benzothiazole)

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Diphenyl Guanidine (D.P.G.)
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ULTRA ACCELERATORS FOR LATEX, ETC.

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Pip-Pip
Thiurad® (Tetra methyl thiuram disulfide)
Ethyl Thiurad (Tetra ethyl thiuram disulfide)
Mono Thiurad (Tetra methyl thiuram mono sulfide)
Methasan® (Zinc salt of dimethyl dithiocarbamic acid)
Ethasan® (Zinc salt of diethyl dithiocarbamic acid)
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OBITUARIES

D. F. Twiss

Dr. D. F. Twiss, world-renowned expert on rubber technology, died at Barton-on-Sea, Hants., England, recently. He was 68 years old. Until his retirement in 1946, Dr. Twiss had been associated with the Dunlop Rubber Co. for 32 years as chief chemist. During that time he played an important part in the scientific development of the rubber industry. Dr. Twiss had about 200 patents in his name, most of them as the result of research into the properties of rubber. More than 100 of these patents related to latex.

Born in Birmingham, England, in 1883, Dr. Twiss was trained in Mason College and was placed first on the roll of undergraduates when that college became the University of Birmingham. He held degrees in research from London and Birmingham Universities. Before 1914, Dr. Twiss was a lecturer in chemistry at Birmingham Central Technical College. In July, 1914, he joined Dunlop as their first scientist.

During his years with the company, Dr. Twiss carried out a considerable amount of work on vulcanization with sulfur and experimented with many types of chemical substances as accelerators. One of the most powerful accelerators known in the rubber industry, zinc isopropyl xanthate (ZIX) was discovered by him. The use of metallic oxides, especially zinc oxide, in the presence of organic accelerators of vulcanization was another of his discoveries.

Dr. Twiss evolved the theory of vulcanization which suggests that a rubber sulfide product is formed which acts as a reinforcing agent for the rest of the rubber mass and which material, since it is actually formed in rubber itself, gives a very effective type of reinforcement, thus affording an explanation of the much superior qualities of vulcanized rubber over those of raw rubber.

Dr. Twiss was also a pioneer in the use of preserved rubber latex for the direct production of rubber articles by a new technique. His early experiments led to the great latex industry for the production of rubber thread of improved properties and of self-ventilating sponge rubber with inter-communicating cells of a controlled size.

He was a Fellow of the Royal Institute of Chemistry and of the Institution of the Rubber Industry. In 1934, the latter group awarded him its highest honor, the Colwyn Medal, in recognition of his scientific contributions to the knowledge of rubber. Dr. Twiss served on various committees, including those of the Research Association of British Rubber Manufacturers and of the Institution of the Rubber Industry. He was a vice-president of the latter organization. He also represented the Dunlop organization on the London Advisory Committee for Rubber Research (Ceylon and Malaya) from its inception until his retirement.

Among his scientific publications were a volume, of which he was part author, "A Textbook of Inorganic Chemistry," dealing with the chemistry of sulfur and oxygen, and "A Course of Practical Organic Chemistry," of which he was also joint author.

Joseph P. Maider

Joseph P. Maider, production manager of the Chemical Production Department of the Goodyear Tire & Rubber Co., died suddenly at his desk on June 27 in Akron, Ohio. He was 64 years old. Born in Phoenix, N. Y., Mr. Maider was graduated from Cornell University in 1911 with a bachelor of chemistry degree. Prior to joining Goodyear in October, 1917, Mr. Maider was city chemist for Spokane, Wash., for six years. He filled several positions for the company before going into tire compounding in 1924. He remained there until 1931 when he went into process development and compound control. From 1933 to 1935, Mr. Maider was in research and then became executive assistant in Pliofilm. The following year he was appointed assistant manager of that department and only one month later was made manager of chemical products. Later, he was named production manager of chemical production. Mr. Maider was a member of the American Chemical Society, the American Institute of Chemical Engineers and the Torch Club. Funeral services were held on June 29 at the Billow Chapel in Akron, with interment at Pine Plains Cemetery, Clay, N. Y. His sister and two brothers survive.

Edward H. Holmen

Edward H. Holmen, manager of sales and merchandising for the Tire Division of the Dayton Rubber Co., Dayton, Ohio, died on June 26 at Miami Valley Hospital in Dayton of Hodgkins disease. Mr. Holmen joined Dayton Rubber in January, 1947, coming to that company from Firestone where for 18 years he worked in all phases of selling and merchandising of passenger and truck tires. He was also truck tire sales manager of the Firestone company. Mr. Holmen is survived by his wife and three daughters.

George C. Crossley

George Corliss Crossley, president of the United Clay Mines Corp., died on June 8 in a hospital in Chester, Ill., of injuries suffered in an automobile accident on the previous day. He was 69 years old. Mr. Crossley was also president of the Prospect National Bank of Trenton, N. J. He had been president of the Trenton Rotary and the Trenton Bankers Association. His wife and daughter survive.

Hiram S. Rivitz

Hiram S. Rivitz, chairman of the board of the Industrial Rayon Corp., Cleveland, Ohio, died on June 4 at Mount Sinai Hospital in Cleveland, where he had undergone an operation after a brief illness. He was 68 years old. Born in South Norwalk, Conn., in 1883, Mr. Rivitz won a scholarship to the National Farm School near Philadelphia, Penna., when he was 14 years old. He came to Cleveland shortly after the turn of the century where he later established his own wholesale plumbing and heating supply business. His success in this field enabled him to retire at the age of 39. In 1926, he agreed to investigate the affairs of what was then known as the Industrial Fiber Corp. Mr. Rivitz agreed to attempt to revitalize the company, and was named vice-president and general manager. In 1927, he was elected president. He held this office until January, 1949, when he became chairman of the board of directors. During his 25 years with the company its net worth increased from $6,000,000 to $60,000,000 and its production capacity increased twenty times. Funeral services were held on June 6 at Mayfield Mausoleum in Cleveland.

Joseph S. Michtom

Dr. Joseph S. Michtom, president of the Ideal Plastics Corp., and secretary of the parent company, Ideal Toy Corp., both of Hollis, L. I., N. Y., died of a heart attack while playing golf on June 21 at Engineers' Golf Course in Roslyn, L. I. He was 61 years old. Born in Newark, N. J., Dr. Michtom was graduated from Columbia University in 1908 and from New York University Dental School in 1915. He practiced dentistry for 22 years before joining the Ideal Novelty and Toy Co., now Ideal Toy Corp., which had been founded by his father, the late Morris Michtom. Dr. Michtom was also president of the Ideal Rubber Co. of Brooklyn, N. Y., a former subsidiary of Ideal Toy. Dr. Michtom was a member of the Manhattan and Brooklyn Dental Societies and president of Beth-El Hospital in Brooklyn. His son and daughter survive.

Warren E. Emley

Warren E. Emley, who retired a few years ago as chief of the Organic and Fibrous Materials Division of the National Bureau of Standards, died in New Brunswick, N. J., on June 5. Graduated from the University of Michigan in 1906, Dr. Emley received the first graduate degree in chemical engineering granted by that school in 1912. Dr. Emley entered government service in 1909 as a junior chemist with the Geological Survey and a year later was transferred to the Pittsburgh Laboratory of the Bureau of Standards.

William G. Smith, Jr.

William Graves Smith, Jr., former New York rubber importer and recently an independent investment broker, died in Grasslands Hospital, Eastview, N. J., on June 19. He was 48 years old. His mother and daughter survive.

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Robert W. Pemberton, Jr.

Robert Walton Pemberton, Jr., for the past five years associated with American Anode, Inc., Akron, Ohio, as a chemist, died on June 9 at St. Thomas Hospital in Akron. He was 36 years old. Before joining American Anode, Mr. Pemberton had been associated with the B. F. Goodrich Co. for three years as a chemist. Mr. Pemberton was graduated from the University of Kentucky and received his master's degree from North Dakota Agricultural College. He was a member of the American Chemical Society. Funeral services were held on June 12 at the McGowan-Reid Funeral Home in Cuyahoga Falls, Ohio, with interment in Rose Hill Cemetery. His wife, a son and a daughter survive.

William A. Littlefield, Sr.

William A. Littlefield, Sr., for 43 years associated with the Raw Materials Purchasing Department of the Hood Rubber Co., Watertown, Mass., died on June 14 at his home in Waltham, Mass. He was 59 years old. Mr. Littlefield joined Hood after graduation from Watertown High School and rose to the position of chief purchasing agent six years ago. He was a member of the National Board of Rubber Arbitrators, and during World War II he was inspector for the Port of Boston for rubber imports. Mr. Littlefield was also a life member of the American Association of Malaya. Services were held in Waltham on June 16. Mr. Littlefield leaves his wife and two daughters.

Bartholomew J. Barry

Bartholomew J. Barry, a partner in the textile firm of Curran & Barry, 320 Broadway, New York, N. Y., died on June 3 at his country home in Rumson, N. J. A Knight of Malta, Mr. Barry was a governor of the Rumson Country Club and the Seabright Beach Club at Seabright, N. J. He was active as a director of the New York County Grand Jurors Association and in the American-Irish Historical Society. Mr. Barry was a member of the New York Yacht Club, the American Newcomen Society and the Turf and Field Club. His wife and two daughters survive.

Everett W. Howe

Everett W. Howe, plant engineer of the Providence, R. I., plant of the U. S. Rubber Co., died suddenly at his hime on May 24, after a brief illness. Born on May 17, 1900, in South Berlin, Mass., Mr. Howe was graduated from Massachusetts Institute of Technology in 1922 with a degree in mechanical engineering. He started work with U. S. Rubber at the Providence plant as a power engineer in 1934, and was appointed plant engineer in 1939. He was a member of the Alumni Association of M.I.T., and the American Society of Mechanical Engineers. He leaves his wife, his son, and a daughter.

Dryer Fire Fizzles

The benefits of adequate fire protection were recently demonstrated at the plant of Hewitt Rubber at Buffalo, N. Y. A new steam-heated dryer was installed. Foam rubber cushions are carried on a slat conveyor through the dryer. Men operating the dryer noticed smoke and while looking for the source they heard a sprinkler inside the dryer operate. The dryer was stopped and a side panel removed. It was found that there had been a fire in a cushion but the sprinkler had extinguished it completely. The fused sprinkler was replaced and, after a clean-up, operations were resumed. The disruption was brief and the damage was minor, because management had been careful to have the automatic sprinkler installation completed some time before the dryer was operated.

Kuljian Establishes Scholarships

To help engineers meet problems of human relations that are often encountered in their work, particularly in foreign countries, Harry A. Kuljian, noted Philadelphia engineer and head of the engineering firm bearing his name, has established two scholarships for seniors at the Massachusetts Institute of Technology. Mr. Kuljian was graduated from M.I.T. in 1919. These scholarships are intended to help promising engineering students to round out their education in world affairs, traditions, economics, and the humanities. The scholarships, valued at $500 each, are to be awarded to two seniors whose records indicate exceptional promise. The creation of the new School of Humanities and Social Studies at M.I.T. encouraged Mr. Kuljian to establish these scholarships, and at his request candidates for them are to be nominated by Dean Burchard of the new school. The purpose of the scholarships is to assist the winners to broaden their education in the field of the humanities and social studies, in order that they may gain a better understanding of human relations in applying their technical training, officials of the Kuljian concern said.

Quaker Rubber Expansion Program

Quaker Rubber Corp., a division of the H. K. Porter Co., has embarked on a $250,000 expansion program at its plant in Philadelphia, Penna., to increase its capacity for manufacturing high pressure wire-braided hose for the U. S. Air Force. J. R. Keach, vice-president and general manager, said the entire budget will be spent for special manufacturing equipment needed for production of high pressure hydraulic control hose. Any surplus production will be made available to manufacturers of earth moving equipment, farm tractors and similar heavy equipment.

Joseph L. Turner

Joseph L. Turner, technical consultant for the National Lead Co., New York, N. Y., died on June 12 at his home in Fair Haven, N. J. He was 70 years old. Mr. Turner had been associated with National Lead for more than 20 years. Born in Odessa, Russia, Mr. Turner was formerly director of the company's Titanium Division. Previously, he had been associated with the Bristol-Myers Co. Mr. Turner was a member of the Beacon Hill Country Club, Lincroft, N. J., the American Chemical Society and the Electro-Chemical Society. His wife, a son and a daughter survive.

Edward L. Moreland

Professor Edward L. Moreland, retired executive vice-president of Massachusetts Institute of Technology, died on June 17 at his summer home in West Falmouth, Mass. He was 65 years old. A native of Lexington, Va., he was graduated from Johns Hopkins University in 1905. In 1908, he received his M. S. degree from M.I.T. He had headed the Department of Electrical Engineering at M. I. T. since 1935 and had served as Dean of Engineering from 1938 to 1946 when he was named executive vice-president. Professor Moreland retired on June 1, 1950.

Mansfield B. Snively

Mansfield B. Snively, treasurer of the Baker Castor Oil Co., New York, N. Y., died on June 9 at Overlook Hospital in Summit, N. J. He was 88 years old. Mr. Snively had been associated with Baker Castor Oil Co. for the past fifty years. He was born in Litchfield, Conn. Mr. Snively is survived by two sons.

Opens New Research Center

Johnson & Johnson has opened its new $2,000,000 research center at New Brunswick, N. J. The 85,000 square foot structure has 60 completely equipped laboratories and laboratory offices and a pilot manufacturing unit capable of duplicating, on a test scale, most of the company's manufacturing operations. According to company officials, about 75% of the work of the center will be devoted to process and product development and improvement of present products. The remaining 25% will be directed to research without specific regard to products.

Text on Consulting Services

The 1951 edition of "Consulting Services," the thirteenth to be issued to date, has been made available by the Association of Consulting Chemists and Chemical Engineers, Inc., 50 East 41st St., New York 17, N. Y. Completely revised and enlarged, the directory lists all of the members of the Association with detailed data on the respective consulting services they offer to industry. A geographical section of the membership is also included for the user's convenience. Copies of the 1951 edition are available from the Association without charge on request.

RUBBER & PLASTICS MACHINERY BULLETIN

Reporting News and Machine Design Developments

IN BUSINESS TO NRM REDUCE YOUR COSTS

Extruder Specifications Available

Specification bulletins on all sizes of NRM Rubber Extruders, 2½" through 12", are now available.

For copies of bulletins, specify sizes of extruders in which you are interested, and write Rubber Machinery Division, National Rubber Machinery Company, Akron 8, O.

Specifications cover Extruder construction, screw speeds, recommended motor drive, and include piping and floor plan drawings.

New MIL-X-TRUDER eliminates warm-up mill

A new development from the NRM laboratories permits recirculation of stock in the Mil-X-Truder, eliminating the additional milling formerly done on the warm-up mill. Elimination of the warm-up mill and labor for its operation, and reduction of maintenance and floor space requirements will materially reduce extrusion costs.

Stock can be fed to the Mil-X-Truder in the form of pelletized stock, stripped direct from the roll-out mill, or strip-fed at room temperature, with equally satisfactory results.

Many materials difficult to extrude such as Silastic compounds can now be fed hot or cold to a Mil-X-Truder. Commercial accuracy can be maintained on sticky materials and asbestos loaded materials. Neoprene, Buna and Butyl are brought into the class of standard extrusions by this equipment.

SZEGVARI ATTRITOR REDUCES COSTS; HAS REVOLUTIONIZED GRINDING PROCESSES

The Szegvari Attritor was developed by pioneers in latex processing. This new fine grinding machine makes conventional equipment obsolete—both by production and mechanical operation standards. Unlike conventional grinders, the Attritor has a stationary grinding tank instead of bulky rotating cylinders. Grinding elements and charge are intimately mixed together and exposed to controlled agitation by an especially designed agitator.

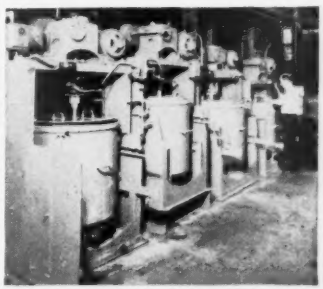


Photo: Courtesy American Abode, Inc.

Szegvari Attritors are built by NRM for the Union Process Co., Akron, Ohio—Specialists in grinding equipment. This battery of four Attritors has been in operation over a period of years grinding almost all ingredients used in rubber processing—including vulcanizing agents, color pigments, etc.

The Szegvari Attritor is small, but output is large. An Attritor requiring floor space of only 55" x 77" can produce as much as 20 times faster, with finer size, than conventional grinders. No elaborate mountings or foundations are necessary.

Greater safety in grinding hazardous material is another Attritor "plus". Reason: The volume of active grind in the Attritor is small and there is *no mechanical action in the air space* above the grind. Also a jacketed tank gives accurate temperature control. Rapid charging and discharging of the Attritor is achieved by a built-in pumping system.

MANPOWER SAVED WITH AUTOMATIC BIAS CUTTER CONTROLS

No operator needed in band-building set-ups for different ply widths

With the use of NRM's fully automatic bias cutter controls, no operator is needed in band-building set-ups, which require cutting one width for a period of time, then changing to another width for a similar period.

Manual operation can be used where desired for abnormal conditions, and service personnel can check the cutter occasionally. However, the cutter will operate as long as the cut stock is being removed from the bias cutter table. An auxiliary device accurately positions the stock in line with the splicing take-off for maximum splicing efficiency.

Ply widths are gaged and controlled directly by two photo-electric cells, mounted on the cutter bar. The width being cut is indicated on a large, easily read scale. Handwheel adjustment of ply width can be made from either side of the cutter.

A control station mounted on the side of the cutter provides for complete control of all electrical equipment: cutter motor, and let-off motor. A main control panel houses the control elements.

The table is driven by a special motor.

CUTTING SPEEDS

Range of ply widths	Max. cuts per minute
10" to 24"	20
24" to 36"	18
36" to 48"	15

The handwheel normally used for final determination of width is equipped with a clutch to permit disengaging the handwheel for automatic operation.

Your present cutters can be converted for fully automatic operation by the addition of NRM's electronic equipment, a knurled table drive roll with integral drive sprockets, a self-leveling high festoon, and separating rolls to open a space between plies for photocell operation.

Angles from 45° to 90°, and ply widths from 10" to 48" are permitted with the standard arrangement. Greater widths can be accommodated with less angle adjustment.

NATIONAL RUBBER MACHINERY CO.

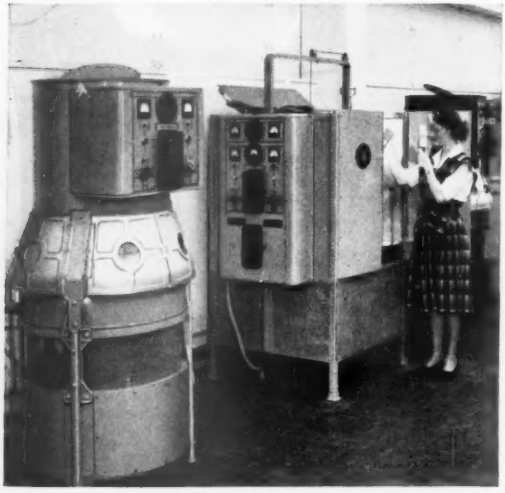
General Offices & Engineering Laboratories
Akron 8, Ohio

PLANTS at Akron and Columbiana, Ohio and Clifton, N. J.
AGENTS East: National Rubber Machinery Co., Clifton, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Calif.
EUROPE Rubber Machinery: GILLESPIE & COMPANY
96 Wall Street, New York 5, N. Y.

Creative Engineering

ATLAS-OMETERS

. . . used in Quality Control for plastic or rubber products at B. F. Goodrich Company



An important part of the tests at B. F. Goodrich Company Laboratories involves subjecting products to the destructive effects of weathering conditions they will be expected to meet in service. By using Atlas Fade-Ometers and Weather-Ometers it is often possible to obtain quickly, in advance of actual service, assurance that new materials will have satisfactory resistance to cracking, sun-checking, chalking, fading or bleeding of color, or to loss of elastic properties.

In the Fade-Ometer—used to check the reaction of any material or type of finish to the deteriorating effects of sunlight—plastic materials such as Koroseal are tested for permanence of bright color. The Weather-Ometer—which accurately duplicates rain, heavy dew, sunlight and thermal shock—offers complete control of these elements so that any desired climatic cycle can be obtained. Results of tests in the Weather-Ometer are used in the evaluation of the aging and weathering characteristics of rubbers and plastics under accelerated conditions corresponding to outdoor exposure.

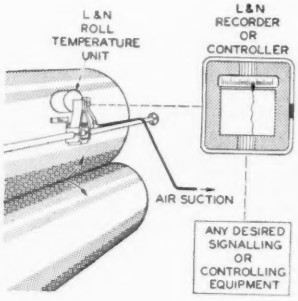
The machines are easy to operate, fully automatic, and may safely be left in continuous operation overnight without attention from the operator.

ATLAS ELECTRIC DEVICES CO.
361 West Superior St., Chicago 10, Illinois
WEATHER-OMETERS • FADE-OMETERS • LAUNDER-OMETERS

NEW EQUIPMENT

Roll Surface Temperature Unit

A new roll surface temperature unit which measures temperature of a moving roll surface without touching the roll has been developed by the Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Penna. Because of unique design, the new unit cannot scratch, score, or in any way destroy delicate surface films. Temperature



detected by the unit is recorded automatically by either a Micromax or Speedomax instrument supplied as an integral part of the complete equipment. The recorder can be equipped to operate signals or controls.

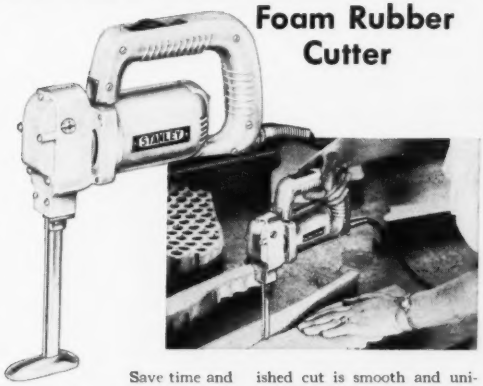
Applicable to roll diameters down to 9 inches and to flat surfaces, the new detecting unit operates independent of surface speed, emission characteristics, and finish. It can be mounted at the center of the roll or at any other location, wherever actual temperature measurement is desired.

This new primary element works on the principle that a moving object carries with it a thin, closely adhering layer of air nearly the same temperature as the moving surface. Mounted 1/32nd of an inch from the surface is a measuring head, contoured to fit the roll. A continuous stream of air is sucked past the measuring element and thus heats it to virtually the same temperature as the roll surface.

Although recorded temperature is a few degrees lower than true surface temperature, the difference remains substantially constant and is therefore negligible in process control (—4° F. or less). The unit provides temperature measurements well within limits of industrial requirements. Air suction rate and surface speed are non-critical over wide limits. Measurements are not appreciably affected by ambient temperature.

Compound joint with spacing slide makes it easy to position the measuring head concentric with the roll and at proper spacing. Should material adhere to the roll surface, a safety bumper retracts the measuring head. The unit can also be supplied with a safety switch which operates in conjunction with this retracting device. This safety actuates a bell, horn, or light to signal the operator and freezes the control until the measuring head is completely reset.

STANLEY No. 99 Sponge or Foam Rubber Cutter



Save time and materials in cutting sponge and foam rubber with this new Stanley electric tool. Cuts at speeds up to 30 feet a minute on thicknesses up to 4". Follows any line or templet with hairline precision. Finished cut is smooth and uniform. Light weight (4 lbs.) and duplex handle make it easy for girl operators to handle. Ask your tool supplier about the No. 99, or write for literature. Stanley Electric Tools, 562 Myrtle St., New Britain, Conn.

HARDWARE • TOOLS • ELECTRIC TOOLS
STEEL STRAPPING • STEEL

STANLEY
Reg. U.S. Pat. Off.

for PRODUCTION and LAB TESTING

B. F. GOODRICH-CORD TENSION VIBRATOR

Quickly gives you dependable accurate, correlated comparison of your own production runs and a true comparison with competitive filaments.

For Cotton, Rayon and Nylon

Exclusive Manufacturers

FERRY MACHINE CO., KENT, OHIO

Export Sales Through Binney & Smith, International

Important!

We are pleased to announce that our production capacity for our MARK® series of vinyl STABILIZERS has been **expanded** and these products will be more freely available.

Here are 6 outstanding features of this series of vinyl stabilizers.

1. In operation of calenders and extruders at ***high speeds*** and ***high temperatures.***
2. In production of ***semi-rigid*** films, sheeting and shapes.
3. In production of ***thin gauge*** films.
4. In maintenance of ***uniform color*** during long production runs, especially in tints and pastels.
5. In production of ***non-staining*** vinyl compounds.
6. In production of vinyl products extremely ***resistant*** to heat and light degradation.

Our past experience has shown that our MARK® STABILIZERS may be the answer to your **difficult problem** in vinyl stabilization. May we send you further information and samples?

ARGUS CHEMICAL LABORATORY

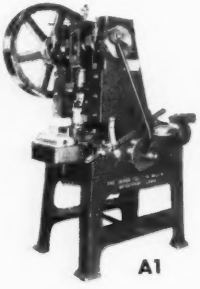
633 COURT STREET • BROOKLYN 31, N. Y.

Men who Know PRODUCTION MACHINES Choose

the James COULTER Machine Co.
BRIDGEPORT, CONN.

For MORE than Half a Century the name COULTER has meant MORE in higher quality cuttings . . . MORE IN GREATER PRODUCTION.

MODEL A-1
Cutting Heels at high speed production or short runs.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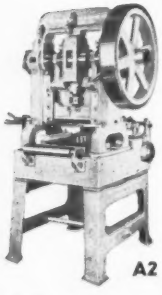
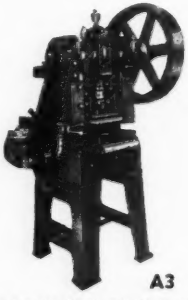

A2

MODEL A-2
Cutting Multiple Heels, Half and Full Soles with stock grain.

MODEL A-3
Cutting Multiple Heels and Taps with or across stock grain.

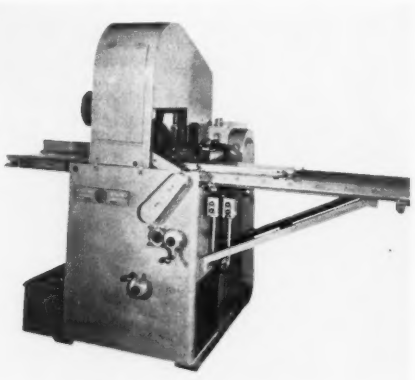
MODEL A-2s
(Not illustrated)
Cutting across grain of stock.


A3

COULTER PRODUCTION MACHINES SINCE 1896

Black Rock SC-6 Cutting Machine

A cutting machine adaptable for cutting at the end of an extruding machine, eliminating the hand cutting operations used in most plants, has been developed by the Black Rock Manufacturing Co., Bridgeport, Conn. Designated as the SC-6, the unit has also been proved successful in cutting stock directly from a tubing machine. The length of stock can be cut to the size desired while the machine is in motion. Hollow stock can also be cut with a minimum of deformation. The unit will handle regular stock up to 6 inches in diameter and can handle thin flat stock up to 12 inches wide. In cutting stock of rectangular cross sections, the capacity in width is determined by the thickness. The maximum length of cut is 28 inches.



The length of cuts with the new unit is infinitely variable through a positive variable transmission and adjustable throw eccentric, synchronized with the operation of the knife. The length of the cut can be varied during the operation of the machine when required to adjust for variation in volume. The machine is equipped with a driven stripper belt to facilitate feeding of the stock. The number of cuts per minute is variable from 20 to 160 by means of a 2 h.p. variable speed main drive. This drive also allows for synchronizing the operation of the unit with the speed of a tuber when used jointly.

The SC-6 unit is completely equipped with an input conveyor and driven stripper belt measuring 6 feet long and 12 inches wide, and a take-off conveyor 3 feet long and 12 inches wide. All gears and drive units are completely enclosed and run in oil for proper lubrication. Cutting lubricants other than water can be economically applied through the use of a separate recirculating unit which can be furnished if desired.

A collapsible **materials handling box** which can be dumped by a lift truck with revolving apron is the latest development of the Phillips Mine & Mill Supply Co., Pittsburgh 3, Penna. It is capable of being collapsed or erected in less than 20 seconds. The box can be completely inverted without slipping off the lift truck.

HOW TO ELIMINATE
High Pressure Valve Troubles

If your rubber factory pressures go as high as 6,000 lb. per sq. in.—if you want shockless pressure reduction—if you want a valve that will handle water, oil, or air—and if you want a truly dependable and rugged valve,

Install an

ATLAS Type "E"
High Pressure Reducing Valve

like that shown at the left. You will be as well pleased with this excellent valve as are the leading rubber factory users throughout the world today.

Ask for Complete Data

In this space we cannot tell all about Type "E", but, briefly, the body is made of the strongest forged steel. Internal metal parts are stellited or specially protected. A formed packing of special material superior to leather is used which is immune to all fluids commonly used in hydraulic machinery. The pressure on the seat is balanced by a piston with the result that variations in high initial pressure have little effect on the reduced pressure. *We will be glad to send complete data by return mail.*

For other ATLAS rubber factory products see the partial list in our ad in the January, 1951, issue of RUBBER AGE.

ATLAS VALVE COMPANY
REGULATING VALVES FOR EVERY SERVICE
251 South Street, Newark 5, N. J.
Represented in Principal Cities

RANDALL & STICKNEY
Hand Grip Rubber Gauge No. 3-B

Height	9"	Length	9¾"	Range	½"
Depth of Throat	6½"	Dia. 50 Divisions Each Div. 1/1000"		Weight	4 lbs.
				Frame	Aluminum

Designed for gauging stock as it is coming from the calender.

FRANK E. RANDALL CO., Inc., Waltham 54, Mass.

COSTS GOING *DOWN? TODAY?*
Why, sure!

LOWER CURE COSTS
by using MARTIN
All-Nylon Cure Wrapping Tape

Slash total tape expense

Get up to 60 curings from Martin longer-lasting All-Nylon Tape. Get 7 to 10 times more service than from cotton tape.

Produce a better finish

Get greater natural smoothness faster. Martin All-Nylon Cure Wrapping Tape often eliminates a buffing operation.

Thermoid Company, Trenton, New Jersey, depends on Martin All-Nylon Cure Wrapping Tape

Check these superiorities:

Looped edge • Natural color • Standard widths in stock (1¾", 2", 2¼", 2½", 2¾", 3⅛", 3½") • Special widths on request • Put-up, 72 yard rolls, or to order

Martin
All-Nylon Cure Wrapping Tape

Send for sample yardage today

MARTIN FABRICS CORPORATION
48 WEST 38TH STREET • NEW YORK 18, N. Y.

CUSTOM FINISHING

•

If you are working on Government contracts that require treating belting duck or other cotton piece goods or webbing and rope with mildew resistant agents to meet Army or Navy specifications, we are equipped to process such materials to meet needed requirements.

If you desire cotton, rayon or nylon fabrics treated with latex compounds that permit adhesion with rubber stocks, we can supply such treatments and request you consult us regarding this type of finishing.

With our CAPITOL LINER PROCESS, we are prepared to finish your own cotton piece goods or supply you with complete treated liners in the width, weight and type of fabric you desire.

•

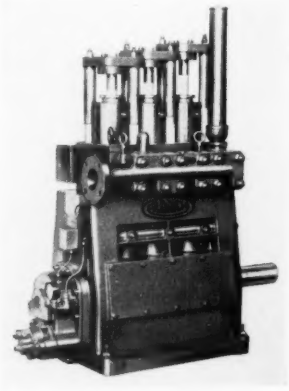
Originators of *The Capitol* *Liner* *Process*

TEXTILE PROOFERS INC.

181 Culver Ave., Jersey City 5, N. J.

Triplex Direct Flow Pump

The addition of a 3-inch stroke triplex direct flow pump to its over-all line has been announced by the Aldrich Pump Co., Allentown, Penna. This triplex unit can operate at speeds up to 500 rpm—an increase over previous models, resulting in more work from a

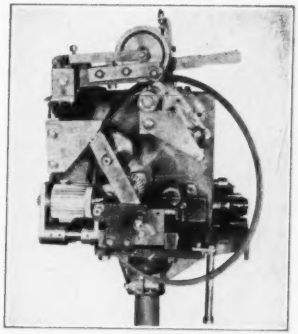


lighter, more compact pump. Power ranges up to 50 hp; pressures up to 3800 psi, and displacement up to 96 gal./m (3275 bbl/day) at 790 psi, 500 rpm. The Direct Flow Pump was so named because it passes liquid in a straight line, directly through the working barrel. Aldrich engineers eliminated two right angle turns in the fluid-end block. This change in design resulted in a reduction of "loss space" in the fluid-end. It improved the volumetric efficiency and saved materials as well. The fluid-end is sectionalized in construction so that maintenance is simplified and inexpensive. Change in plunger size can be readily made to meet alterations in pressure or capacity.

Keep Cool

SEE PAGE 388

Utility Crimper Type Flipper
for
Truck and Large Balloon Tires



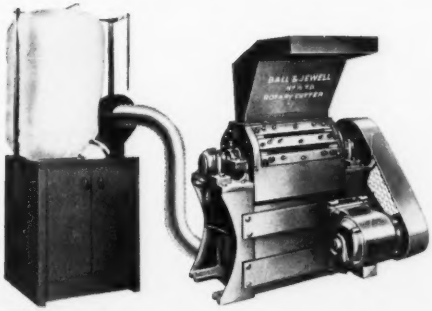
UTILITY MANUFACTURING COMPANY

Cudahy, Wisconsin

Cable Address: UTILITY-MILWAUKEE

Long Distance Phone Call

MILWAUKEE—SHERIDAN 4-7020



B&J

No. ½ T. D. Grinder for Foam & Sponge Scrap Rubber

Minimum floor space—maximum utility. When equipped with B & J engineered air suction system, it has a 200 to 250 lbs. per hr. capacity of ⅜" granules. Available with 5½" x 20" throat.

For grinders with capacity of 50 to 3,000 lbs. per hr. Contact Ball & Jewell, Inc., 28 Franklin Street, Brooklyn 22, N. Y.

BALL & JEWELL, INC.

B & J builds the answer to any grinding problem

everybody talks QUALITY

R-1599 **R-2199** **R-2899**

. . . these Pure Light Red Iron Oxides by Williams assure it!

They represent the ultimate in red iron oxide colors for the rubber industry.

Williams iron oxides come to you with all the benefits of our 72 years in the pigment business . . . and as a result of our experience in producing pure red iron oxides to specifications of the leading rubber companies.

Each is manufactured to rigid specifications for copper and manganese content, pH value, soluble salts, fineness, color, tint and strength by controlled processes and with special equipment. *The result is absolute uniformity of product.*

If you haven't already done so, try these finest of all iron oxide colors. Your own tests will show there is no equal for Williams experience.

LET WILLIAMS PUT THE MICROSCOPE ON *Your* COLOR PROBLEM

Whatever your color problem, bring it to Williams. Our 72-year experience can often save you time, money, and headaches in proper color formulation.

Address Dept. 8, C. K. Williams & Co., Easton, Pa.

IRON OXIDES • CHROMIUM OXIDES
EXTENDER PIGMENTS

WILLIAMS

COLORS & PIGMENTS

C. K. WILLIAMS & CO.

EASTON, PA. • EAST ST. LOUIS, ILL. • EMERYVILLE, CALIF.

"We like the Quality of HADLEY Cements... ... WE'VE USED THEM SINCE 1919"

SOLVENT TYPE CEMENTS

HAB-U-CO HAD-U-TEX

LATEX TYPE CEMENTS

These Cements and Compounds, available for rubber, leather, shoe, cloth, and paper manufacturers and converters, combine flexibility with maximum bond strength. Vulcanizing, pressure-sensitive and quick-setting types for specific uses.

SEND FOR SAMPLES

RESIN EMULSION EXTENDERS and TACKIFIERS

For Natural, Neoprene and GRS Latices

HAB-U-CO

HAB-U-FLEX

SPRAY FINISHES, TOO!

Clear and pigmented types for rubber and rubber-like surfaces. Dry to a beautiful sheen, permanently flexible.

SEND FOR SAMPLES

THESE PRODUCTS MANUFACTURED UNDER CLOSE LABORATORY CONTROL

SINCE 1919

HADLEY BROS.-UHL Company

514 CALVARY AVE. • ST. LOUIS 15, MO.

Handling of Hot Molds

The hydraulic elevating table illustrated herewith was especially designed and manufactured by the Lyon-Raymond Corp., Greene, N. Y., for positioning and carrying heavy molds in a rubber processing plant. Slight modifications were made to the manufacturers' standard hydraulic elevating table to meet the custom-

er's special requirements. Serving a battery of presses, each table has two offset grooved wheels which run on angle iron tracks. In order that molds can be placed in the presses at different levels a 16 inch range of elevation is furnished. The top lowers to 28 inches and raises to 44 inches. The table has a capacity of 2000 pounds and the heavy molds roll on the top over a single roller mounted on the front edge of the top. Two stops at the back prevent the mold from sliding off that side. The top will turn 360° or can be locked in one fixed position. Elevation is actuated by a 2-speed hand pump.

Bristol Series 500 Electric Recorders

A new line of recording voltmeters and ammeters, identified as the "Series 500" Electric Recorders, has just been announced by the Bristol Company, Waterbury 20, Conn. These instruments make a continuous record of voltage or current on an 8-inch circular chart, similar to previous models made by the company for many years. However, the new Series 500 instruments feature an entirely new measuring mechanism and a number of other basic improvements. The new moving-iron measuring mechanism produces a high actuating torque at a low electrical burden. The mechanism has shock-protected precision stainless steel bearings, magnetic damping, and a locking device to prevent damage due to rough handling. The instruments are housed in a compact die-cast aluminum alloy case which is moisture-, fume-, and dust-proof. Recording ammeters and voltmeters are both furnished in a variety of models for wall, surface-panel or flush-panel mounting, for either open terminal or conduit connection, as well as various portable and pole mounting models.

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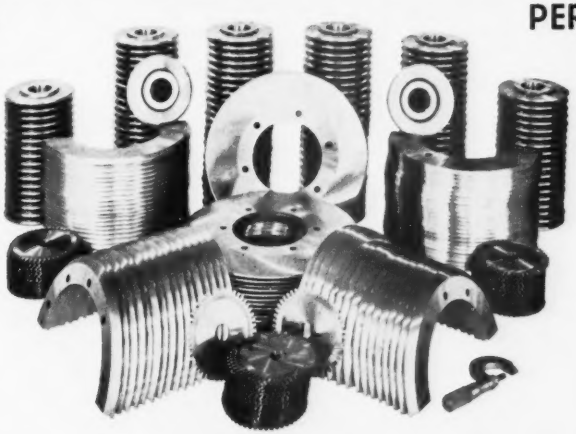

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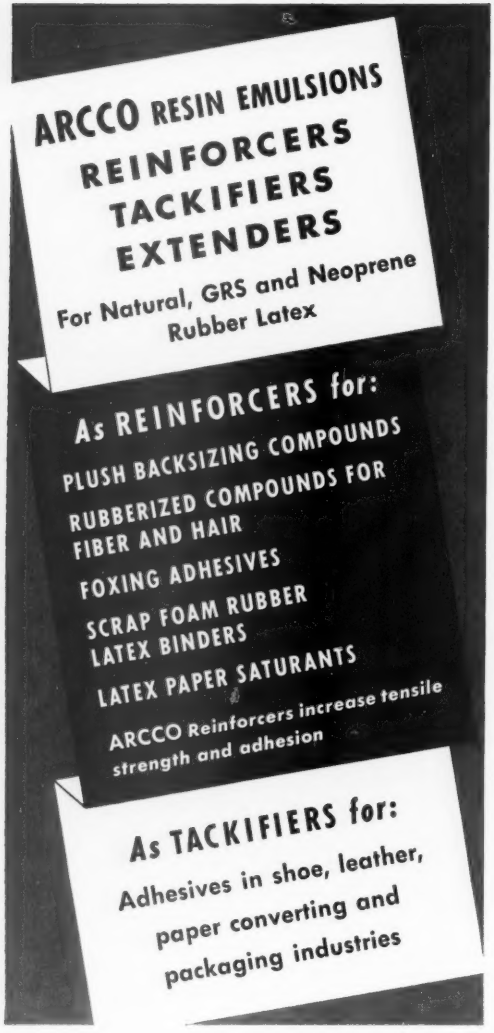

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REVIEWS

BOOKLETS, CATALOGS, etc.

Continuous Automatic Processing Equipment. By C. A. Litzler. Industrial Ovens, Inc., 13825 Triskett Rd., Cleveland 11, Ohio. 8½ x 11 in. 16 pp.

This booklet presents a timely and practical exposition of some of the more advanced machine design elements involved in continuous coating equipment for such web materials as textiles, papers, films and foils, and strand materials such as wires, cables and synthetic monofilaments. It provides a discussion of various types of complete coating systems and the many different component elements which they embrace. Units for web coating discussed in detail include roller coaters, unwind stands, cooling drums, pull roll stands, drying machines, etc. Similar detailed treatment is given to the component units of both dip and extrusion coating systems of strand materials—letoffs, dip coating pot arrangements, extrusion machines, propelling stands, constant tensioning stands, and winding machines. The booklet includes over 50 photographs and drawings keyed to the text.

•

Geon Resin 404. (Service Bulletin G-6). B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, Ohio. 8½ x 11 in. 12 pp.

This bulletin discusses Geon Resin 404 which is made without plasticizer and which has greatly extended the application of the polyvinyl chloride resins, particularly in the rigid or structural field. Some of the basic applications already proved practical are outlined. It also discusses physical properties, and gives information on tensile and flexural strengths, modulus or elasticity, heat distortion temperatures, impact and chemical resistance and Clash-Berg stiffness. Processing methods are outlined, and suggested starting recipes for calendering, extrusion and molding and wire insulation are given.

•

Medical Problems Encountered in the Manufacture of American-Made Rubber. (Safety Reprint: Rubber No. 1). By Dr. Rex H. Wilson, Dr. Glenn V. Hough, and William E. McCormick. National Safety Council, 425 North Michigan Ave., Chicago 11, Ill. 8½ x 11 in. 8 pp.

This paper deals with medical experiences encountered in the manufacture of the butadiene-type synthetic rubber. The ingredients known or suspected of causing health problems are discussed in some detail. Pathological and laboratory findings are discussed as are methods of treatment and methods of detection. Toxicological properties, results of over-exposure and prophylaxis are described. The article also attempts to review and coordinate the current literature with the authors' personal experiences and observations.

•

Effect of Compounding on Ozone Resistance of Neoprene Vulcanizates. (BL-238). Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 6¼ x 9½ in. 4 pp.

This report establishes the premise that the inherent ozone resistance of neoprene vulcanizates can be enhanced for severe service by compounding. Compounding methods for enhancing this property are discussed in the report. Such factors as the influence of stress, the effect of waxes, the effect of antioxidants, the ozone resistance of various neoprenes, and factors detrimental to ozone resistance are covered.

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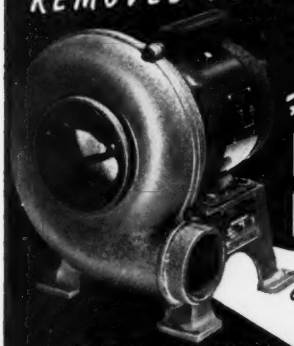

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REVIEWS (CONT'D)

Elmes Hydraulic Equipment for the Plastics Industry. (Bulletin No. 5200-A). Elmes Engineering Division of American Steel Foundries, 1150 Tennessee Avenue, Cincinnati 29, Ohio. 8½ x 11 in. 12 pp.

Presses, pumps and accumulators manufactured by the company specifically for plastics production are described and illustrated in this bulletin. Among the units discussed, are the Elmes Compression and Transfer Molding Presses, and the Elmes Hydrolairs, small-size, light-weight presses with continuous high-pressure stroke, yet without the usual motors and pumps. Hobbing and laboratory presses are also covered as is the line of company accumulators. Complete specifications and dimensions are provided for all the units discussed.

•

Rubber and Its Derivatives as Protective Coatings for Metals. By R. F. Reynolds. Andre Rubber Co., Ltd., Kingston By-Pass, Surbiton, Surrey, England. 6¼ x 8½ in. 16 pp.

The matter of rubber as a protective coating for metals is discussed in this paper. To that end, this paper is not primarily concerned with the elastic properties of rubber, but rather its chemical inertness and resistance to abrasion. The use of soft natural rubber and ebonite as protective coatings are discussed, the use of rubber-lined equipment is outlined, while the use of rubber for impact and abrasion resistance is fully covered. The paper includes a number of photographs depicting rubber linings and coverings as they are used in industry, aboard ship, etc.

•

Purecal in GR-S. Wyandotte Chemicals Corp., Wyandotte, Mich 8½ x 11 in. 56 pp.

A complete outline of the history, properties and uses of "Purecal", Wyandotte Chemical's calcium carbonate, is presented in this interesting and profusely illustrated bulletin. The differences between calcium carbonates are pointed out and their use as a reinforcing filler in comparison with carbon blacks is discussed. Typical formulations utilizing this "white carbon black" are offered with their test properties. Sections are devoted to the Purecals in cold rubber (GR-S X-478) and in ordinary GR-S. Savings which may be effected through the use of non-black fillers are also outlined.

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SEE PAGE 388

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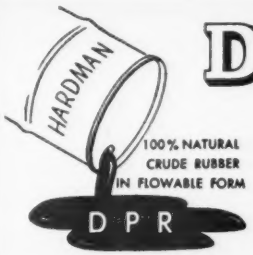

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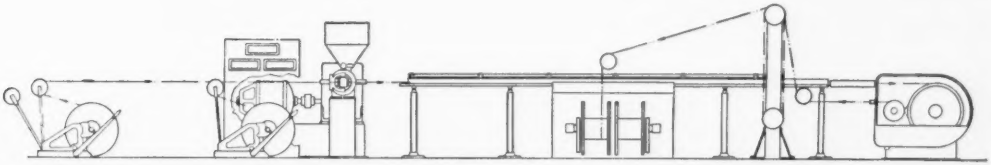

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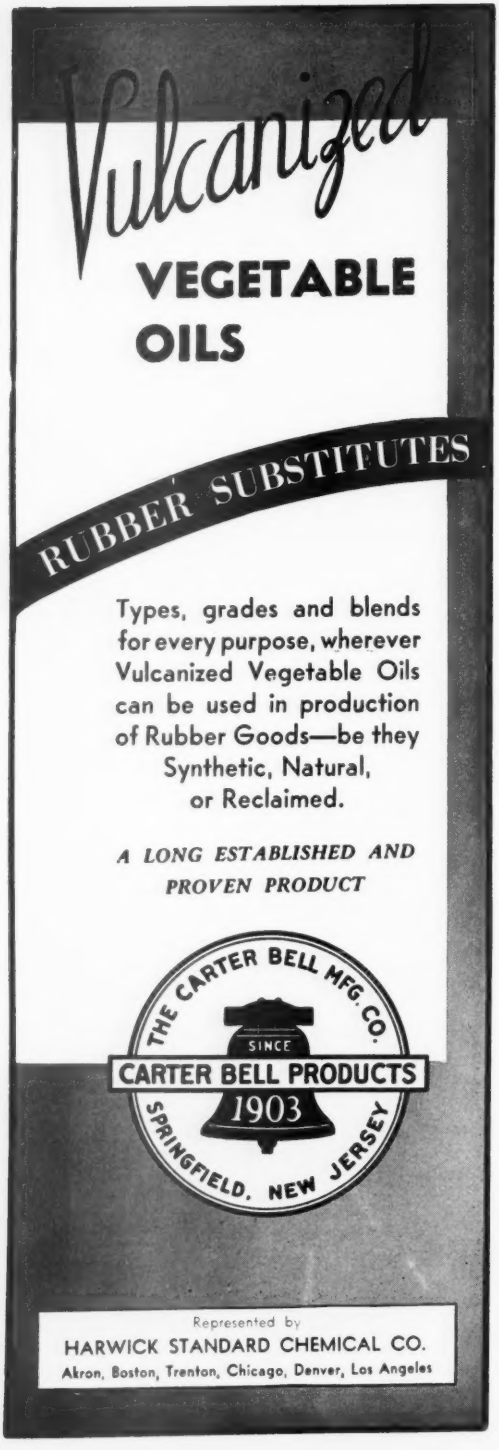
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REVIEWS (CONT'D)

How Increasing Your Steam Costs Can Save Money. (Booklet No. 2171). Sarco Co., Inc., Empire State Bldg., New York 1, N. Y. 8½ x 11 in. 8 pp.

This booklet consists of 16 questions and answers for the executive who doesn't know too much about steam. The questions and the answers are designed so as to provide the reader with enough information to permit him to ask intelligent questions of his men who use and make steam. The booklet does not attempt to "sell" Sarco steam traps, strainers or temperature controls for steam using industry, but devotes itself to helpful information regarding the efficient use of steam.

•

Rubatex Closed Cell Rubber. (Catalog No. RBS-4-51). Rubatex Division, Great American Industries, Inc., Bedford, Va. 8½ x 11 in. 12 pp.

This catalog features a fully detailed chart of the properties of Rubatex closed cellular rubber as improved to meet recently revised ASTM Standards No. D-1056-49T. The methods of testing are clearly stated and ASTM specification numbers listed. Concise explanation of the advantages of Rubatex in various fields is supplemented by illustrations of typical applications. A series of photographs show the principal steps in manufacture, from the compounding of materials to final curing and special fabricating.

•

Ferro Stabilizer Hand Book. Ferro Chemical Corp., P. O. Box 349, Bedford, Ohio. 9¼ x 11¼ in. 38 pp.

Formerly known as the Ferro Stabilizer Data Book, the name of this booklet has been changed to the Ferro Stabilizer Hand Book. It has been revised and brought up-to-date to aid the processor of vinyl polymers in selecting the optimum combinations of Ferro stabilizers for his particular applications. The first section of the booklet covers factors affecting stabilizer choice. The next portion is devoted to product data, and this is followed by a series of technical bulletins on the use of the stabilizers in specific applications.

•

Manpower Resources for the Emergency. (Personnel Series No. 139). American Management Association, 330 West 42nd Street, New York 18, N. Y. 6 x 9 in. 44 pp. $1.25.

This booklet incorporates a number of papers which were originally presented at the Midwinter Personnel Conference of the AMA on February 26 to 28 at Chicago, Ill. The papers cover such subjects as how to meet manpower requirements, mobilizing management manpower, and employee training. A panel discussion on the national manpower mobilization policy is also included.

•

Cost of Distribution Services. Domestic Distribution Department, Chamber of Commerce of the United States, Washington 6, D. C. 6 x 9 in. 156 pp. $1.00.

Approximately half of consumer expenditures go toward offsetting costs incurred by distributors, according to this report, which outlines the distributive process in the United States. The report considers the services offered by the distributor and the advantages which accrue to the economy through these services. A number of interesting tables are presented which outline salient statistics.

•

Electronik Potentiometers. (Catalog No. 15-15). Industrial Division, Minneapolis-Honeywell Regulator Co., Philadelphia 44, Penna. 8½ x 11 in. 36 pp.

"Electronik" electric control potentiometers for both contact and proportional control are covered in this catalog. Engineering and construction data, types of control, a partial list of available ranges, application data, and accessories are included. The catalog is illustrated with engineering drawings, photographs, charts and tables.

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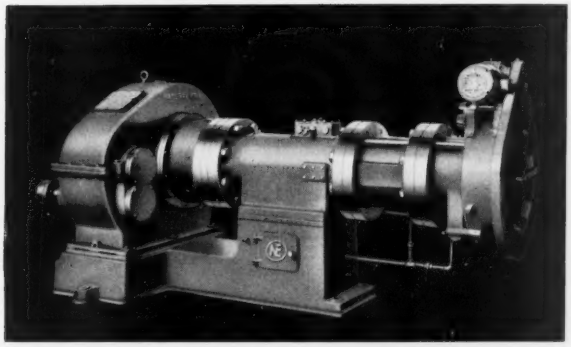

Note how Head—Cylinder—Thrust—Gear Reduction and Stock Screw units are engineered for accessibility in this NE 8 1/2" Dehydrator-type Strainer.

View shows unit in operation during World War II in large Copolymer Plant.

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REVIEWS (CONT'D)

Carbon Brushes for Electric Equipment. (GEA-5597). General Electric Co., Schenectady 5, N. Y. 8½ x 11. 28 pp.

This bulletin describes and illustrates the fundamental considerations given to the design, application, and manufacture of carbon brushes and includes a section on brush terminology. Produced to familiarize users with the physical characteristics that must be known before proper recommendation can be made for a brush application, the booklet also tells of the engineering services offered by G-E to help solve specific brush problems. Included are sections on types of brushes, characteristics of brush grades, brush grade recommendations, mechanical design of brushes, and tips on brush replacement.

•

Records Research Reports on the Controlled Materials Plan. (X-1203). Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y. 9½ x 11¾ in. 25 pp.

The answers to many record keeping problems facing manufacturers operating under the Controlled Materials Plan are described in this booklet. Methods for simplifying paper work by laying the groundwork for getting the desired result—a properly balanced and uninterrupted flow of materials to meet production requirements—are outlined. The booklet shows dozens of ways to save on clerical routine, as well as incorporating information necessary for the correct set-up of records required for efficient operation under CMP regulations.

•

Velan Steam Traps. Velan Engineering Co., 1216 Drummond St., Montreal, Que., Canada. 8½ x 11 in. 16 pp.

Steam traps produced by the company for the rubber, chemical, oil and other industries are described and illustrated in this catalog. Distinguishing features of the traps are outlined and depicted in cutaway drawings. Complete specifications, capacities and pressures for each of the units are itemized. The catalog also considers the matter of installation and servicing of the traps. The latter section of the catalog is devoted to the technical qualifications a buyer should look for in steam traps. This section offers many valuable pointers on traps, their selection and use.

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SEE PAGE 388

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, JULY 6, 1951

Natural Rubber

Effective July 1, the General Services Administration dropped the price of natural rubber bought by the government for resale to industry to 52c a pound. The previous price, prevailing since last December, had been 66c per pound. The new price is said to be in line with current world market figures. Complete details on the price decrease will be found elsewhere in this issue.

In Indonesia, political party leaders are still attacking the United Nations embargo as the main cause of the fall in the price of rubber that is threatening the Indonesian economy. Official circles, however, no longer are sure that this view is correct. Rubber market specialists in Indonesia believe that the UN embargo only partly influenced the world rubber price and emphasized that the way in which Singapore's license system was handled had done much more in engineering the price fall.

The fact that Singapore exporters must wait from five days up to a month before knowing whether an export license has been granted causes most of the rubber to flow to non-licensed countries, such as the United States and Britain, while buying competition virtually disappeared from the Singapore market.

The British have also cut off shipments of rubber from Malaya to Russia and her satellites. "Destination control," begun on April 7, has been more widely applied than was at first expected. Rubber shipments to ports other than those in the United States, Ireland and the United Kingdom, with the exception of Hong Kong, must be approved by a special board. The new restrictions have had the effect of lowering the price of natural rubber.

A sidelight to the world rubber pricing problem occurred in Colombia, where the government has granted a 50% price increase in the price of locally-produced rubber and has classified various grades according to the joint resolution of the Minister of Development and Agriculture.

While the immediate impact of the pending truce in Korea is being bearishly construed, there is every probability that the world rubber markets may become quite irregular in the weeks ahead. The gradual downward trend in prices for natural rubber is expected to continue for some time longer. There is little question but that the U. S. Government buying prices remain the dominant factor and there is little to indicate that this will change.

Should the truce talks prove satisfactory and result in an easing of international tension, the feeling is that the government may be more than willing to withdraw as the sole importer. This would permit stockpile buyers a freer hand and offer the rubber market support when needed.

Quotations for the markets in London and Singapore follow:

London Market

(Standard Smoked Sheets)

August	49.87 - 50.46
September	47.54 - 47.83

Singapore Market

(Standard Smoked Sheets)

August	44.37 - 44.52

Scrap Rubber

According to Washington officials, the price of scrap rubber will be rolled back only slightly under the dollar-and-cents price ceiling now being readied by the Office of Price Stabilization. In view of the impending imposition of ceilings, the market has shown only moderate activity. The rollback is being deliberately kept small so as not to discourage the collection of scrap for reclaimers. Price ceilings are expected to be at mill delivered levels. Current quotations follow:

Mixed passenger tires	ton	$28.00
Beadless truck tires	ton	39.00
Mixed truck tires	ton	32.00
Beadless passenger tires	ton	37.00
No. 1 passenger peelings	ton	80.00
No. 1 truck peelings	ton	80.00
Red passenger tubes	lb.	.19
Black passenger tubes	lb.	.13½
Mixed tubes	lb.	.10
No. 2 light colored truck tubes	lb.	.20
Red truck tubes	lb.	.19
Black truck tubes	lb.	.14½
Buffings	ton	45.00

Reclaimed Rubber

At this writing, the trade is awaiting a ceiling price order on reclaimed rubber. Officials in Washington have stated that the reclaim order will be issued as a companion order to one covering scrap prices. It is expected that the price control order on reclaim will be of the dollar-and-cents variety. The industry continued operating at top levels while awaiting the issuance of ceiling prices. Current quotations follow:

Tires

Black, Digester (Natural)	lb.	.10½ - .11
Peels No. 1	lb.	.11 - .11½
Whole Tire (Blend)	lb.	.10 - .10½

Inner Tubes

Black (Natural)	lb.	.24 - .25½
Red (Natural)	lb.	.28 - .28½
Butyl	lb.	.12½ - .13

Cotton Tire Fabrics

The situation in the cotton tire fabric market has remained virtually unchanged during this past period. Stocks on hand are said to be barely sufficient to meet heavy military requirements. As has been the case for the past few months, most suppliers continue their withdrawal from the market in view of the extremely tight situation. The prices below represent figures on a more fluid market. The quotations follow:

Standard, Peeler, 12/4/2	lb.	.95
Extra Staple, Peeler, 12/4/2	lb.	1.00

Chafers

14.4 oz. (per sq. yard)	lb.	.86½
9.25 oz. (per sq. yard)	lb.	.83
11.65 oz. (per sq. yard)	lb.	.81
8.9 oz. (per sq. yard)	lb.	.84

Cotton

The price for middling uplands on the New York Commodity Exchange has held at 46.06c since our last report (June 8). There were 21 tradings days in June. In response to a query from the New York Cotton Exchange, the Office of Price Stabilization, on June 14, ruled on the legality of settlement costs on commodity exchanges for defaults or failure to make deliveries under futures contracts.

In a telegram to the New York Cotton Exchange, OPS Chief Counsel Harold Levanthal, advised (1) it is illegal under the Defense Production Act of 1950 to establish a settlement price for defaults in excess of the spot ceiling prices for the commodity set by OPS, and (2) an exchange may require a predetermined penalty for defaults if provided for in the rules of the exchange.

According to a recently published article by a member of the Chinese Communist party politburo, the 1951 cotton crop yield in China should exceed the previous record year of 1936 and eliminate the need for imports from the United States. As a result of the U. S. embargo against mainland China, a severe shortage of raw cotton is being experienced, and all cotton and raw textile mills have been shut for six weeks because of lack of raw material.

The *Daily News Record* published its first crop estimate of the season on July 5. The acreage is placed at 28,340,000 acres, compared with 18,613,000 acres last year, an increase of 52.3%. The condition of the crop that is up to a stand is 75% of normal compared with 78% last year. Based on past experience this condition figure would indicate a crop of 16,330,000 bales in the new season, the publication reported.

Quotations for middling uplands on the Exchange follow:

	June 9	July 6		
	Close	High	Low	Close
July	44.28	44.60	44.30	44.60
Oct.	37.45	36.18	35.86	36.13
Dec.	37.15	35.87	35.54	35.85

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.465 - .475
Butaprene NL	.475 - .485
Butaprene NAA	.515 - .525
Butaprene NXM	.550 - .560
Chemigum 30N4NS	.460 - .470
Chemigum 50N4NS	.460 - .470
Chemigum N3	.450 - .520
GR-I	.2075
GR-S	.245
Hycar OR-25	.450 - .460
Hycar OR-15	.520 - .530
Hycar OS-16	.500 - .510
Neoprene Types CG and AC	.500
Neoprene Type E	.650
Neoprene Types FR and KNR	.800
Neoprene Type GN	.380
Neoprene Type GNA	.380
Neoprene Type RT	.400
Neoprene Type S	.380
Neoprene Type W	.400
Paracril B	.500 - .510
Paracril BJ	.500 - .510
Paracril C	.580 - .590
Silastic (compounded)	3.35 - 4.40
Thiokol Type A	.370 - .470
Thiokol Type FA	.520 - .620
Thiokol Type PR-1	.750 - .850
Thiokol Type ST	.750 - .850

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Plainfield, New Jersey

STATISTICS *Of Interest to the Rubber Industry*

U. S. Imports and Re-Exports of Natural Rubber

	GROSS IMPORTS											
	Natural Rubber (Dry)			Natural Rubber (Latex)			Guayule				RE-EXPORTS		TOTAL NET IMPORTS
Year	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Total Gross Imports Long Tons	Long Tons	Total Declared Value	Long Tons
1936	467,064	152,072,496	14.54	19,852	6,659,899	14.98	1,229	286,552	10.41	488,145	12,581	4,488,223	475,564
1937	574,600	237,307,041	18.44	23,185	10,213,670	19.67	2,694	745,873	12.36	600,479	7,902	3,385,433	592,577
1938	397,640	125,373,864	14.08	11,944	4,168,127	15.58	2,508	628,886	11.19	412,092	5,652	1,799,124	406,440
1939	469,946	167,586,780	15.92	27,437*	10,467,552	17.03	2,233	463,345	9.27	499,616	13,125	5,832,618	486,491
1940	781,202	303,308,823	17.33	33,789	14,593,466	19.28	3,633*	758,007	9.31	818,624	7,060	3,197,136	811,564
1941	989,498	401,976,317	18.14	34,797*	15,965,627	20.48	4,881	1,145,767	10.48	1,029,176	5,376	2,757,872	1,023,800
1942	266,276	112,537,426	18.87	10,646	5,630,667	23.61	5,523	1,660,792	13.42	282,445	10,856	5,913,386	271,589
1943	50,358	31,369,198	27.81	1,890	1,312,202	31.00	7,678*	3,636,789	21.14	59,926	22,583	16,446,707	37,343
1944	103,847	73,908,549	31.77	3,091	2,092,211	30.99	6,701*	3,351,233	22.33	113,639	9,739	8,712,695	103,900
1945	134,408	95,814,102	31.82	4,733	3,115,853	30.22	10,040	5,963,797	26.52	149,221	9,509	7,201,746	139,712
1946	366,415	222,552,939	27.12	8,421	5,843,085	29.14	5,344	2,859,246	23.89	380,180	7,711	5,331,954	372,469
1947	691,087	306,951,814	19.83	17,542	9,787,722	30.98	2,884	1,492,825	23.11	711,513	4,121	2,354,494	707,392
1948	702,293	290,849,177	18.49	32,745	9,820,080	24.93	302	71,330	10.53	735,340	6,672	3,259,324	728,668
1949	630,818	225,341,459	15.95	29,974	14,970,478	22.30	....	.....	....	660,792	6,253	2,746,109	654,539
1950	751,966	418,794,962	24.85	51,627	39,717,410	34.34	740	254,331	14.54	803,593	8,640	6,832,821	794,953
1950:													
Jan.	54,277	17,881,882	14.71	3,974	1,951,793	21.92	....	.....	....	58,251	431	225,196	57,820
Feb.	50,022	17,373,658	15.51	3,336	1,608,163	21.52	....	.....	....	53,358	558	252,013	52,800
Mar.	57,831	21,120,732	16.30	3,650	1,826,747	22.34	....	.....	....	61,481	659	326,688	60,822
Apr.	72,418	27,412,444	16.89	4,395	2,199,149	22.34	175	47,117	12.02	76,988	639	340,781	76,349
May	56,804	21,822,118	17.15	3,183	1,904,513	26.71	200	58,948	13.16	60,187	597	289,551	59,590
June	73,806	31,525,162	19.07	3,965	2,294,158	25.83	105	33,651	14.31	77,876	625	322,008	76,451
July	53,245	27,256,854	20.11	4,225	2,710,430	28.64	70	26,836	17.11	57,540	683	381,650	56,857
Aug.	67,415	36,092,742	23.90	5,253	3,721,184	31.62	35	9,671	12.34	72,703	1,005	914,279	71,698
Sept.	55,981	36,724,072	29.23	5,117	4,369,707	38.12	55	15,148	12.34	61,153	879	798,935	60,274
Oct.	73,205	53,151,003	32.41	5,161	5,485,816	47.46	10	7,496	33.18	78,376	564	500,623	77,812
Nov.	68,462	62,121,636	40.51	4,456	5,227,022	56.71	29	21,618	33.46	72,947	604	724,050	72,343
Dec.	65,282	66,092,508	45.11	3,954	5,191,321	58.62	25	24,864	44.40	69,236	1,400	1,757,047	67,836
1951:													
Jan.	84,864	90,707,863	47.72	7,502	10,283,208	61.18	88	84,977	43.01	93,366	819	1,150,246	92,547
Feb.	49,217	55,013,580	49.90	5,347	8,314,086	64.91	123	119,086	43.27	54,687	552	790,245	54,135
Mar.	55,574	63,104,361	56.92	7,379	11,140,554	67.40	100	100,048	44.61	62,553	322	449,703	62,231

Source: U. S. Department of Commerce. * Adjusted to agree with total gross imports.

Notes: (1) Figures for latex are on a dry weight basis. (2) Figures for re-exports include natural rubber (dry and latex) and guayule. (3) In the years 1940 through 1943, crepe sole rubber imports were reported under a separate classification. Such imports, which are included under natural rubber, dry above, were: 856,294 pounds, valued at $191,097 in 1940; 379,607 pounds, valued at $85,924 in 1941; 662,503 pounds, valued at $159,530 in 1942; and 21,653 pounds, valued at $5,215 in 1943.

Natural Rubber
(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1936	**488,145**	**575,000**	**12,581**	**223,000**
1937	**600,479**	**543,600**	**7,902**	**262,204**
1938	**411,983**	**437,031**	**5,652**	**231,500**
1939	**499,478**	**592,000**	**13,125**	**125,800**
1940	**818,243**	**648,500**	**7,069**	**288,864**
1941	**1,029,007**	**775,000**	**5,376**	**533,344**
1942	**282,653**	**376,791**	**10,856**	**422,714**
1943	**55,329**	**317,634**	**20,815**	**139,594**
1944	**107,834**	**144,113**	**9,665**	**93,650**
1945	**135,678**	**105,429**	**6,743**	**118,715**
1946	**400,687**	**277,597**	**4,338**	**237,467**
1947	**688,354**	**562,661**	**4,101**	**129,038**
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	804,143	720,268	8,644	91,434
1950:				
Jan.	58,251	59,992	431	108,769
Feb.	53,393	56,580	558	104,477
Mar.	61,481	60,859	659	101,691
Apr.	76,998	57,914	639	106,124
May	60,699	63,813	597	100,776
June	77,876	63,333	625	99,457
July	61,660	61,402	683	93,653
Aug.	72,973	64,297	1,005	87,146
Sept.	61,148	61,281	879	87,409
Oct.	78,376	69,178	564	83,215
Nov.	73,393	51,340	604	81,658
Dec.	67,895	44,999	1,400	91,434
1951:				
Jan.	92,454	44,586	819	93,079
Feb.	54,654	37,572	552	87,242
Mar.	62,904	35,335	332	76,312
Apr.	54,766	39,807	437	71,688

Source: 1936-40, U. S. Department of Commerce; 1941 to date, Rubber Division, OMD, and Predecessor Agencies.

U.S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

	Balata		Jelutong		Gutta-Percha & Other Guttas	
Year	Tons	Value	Tons	Value	Tons	Value
1936	**535**	**199,368**	**6,163**	**1,296,364**	**1,568**	**555,643**
1937	**354**	**151,344**	**7,109**	**2,017,786**	**1,122**	**440,894**
1938	**509**	**181,148**	**9,132**	**2,944,504**	**444**	**284,583**
1939	**694**	**265,553**	**6,640**	**1,603,418**	**1,740**	**539,255**
1940	**648**	**300,500**	**7,451**	**2,449,137**	**2,340**	**1,004,845**
1941	**924**	**489,514**	**8,821**	**2,954,001**	**1,783**	**607,035**
1942	**1,544**	**1,107,059**	**1,200**	**530,296**	**804**	**525,763**
1943	**1,047**	**708,701**	**35**	**14,840**	....	.....
1944	**1,012**	**660,805**	**88**	**45,578**	**10**	**4,999**
1945	**1,361**	**907,253**	....	.....	**36**	**21,970**
1946	**2,281**	**2,233,065**	**304**	**256,169**	**423**	**458,064**
1947	**1,982**	**2,276,531**	**2,878**	**1,496,887**	**392**	**779,591**
1948	**1,195**	**805,078**	**3,401**	**2,377,765**	**423**	**542,788**
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1949:						
Dec.	54	36,980	108	67,002	39	24,061
1950:						
Jan.	61	42,855	37	18,308	56	35,288
Feb.	42	24,040	162	123,570	30	20,291
Mar.	90	66,374	113	97,008	17	13,672
Apr.	68	45,844	246	211,744	30	23,369
May	78	50,093	114	103,796	69	86,151
June	143	74,936	120	104,123	49	112,902
July	109	53,480	118	101,258	64	87,284
Aug.	171	102,985	234	200,912	46	41,790
Sept.	119	102,475	175	146,493	37	59,004
Oct.	372	311,959	174	132,632	64	146,707
Nov.	735	588,135	214	183,907	51	102,599
Dec.	124	126,709	82	91,411	28	16,361
1951:						
Jan.	242	200,534	184	227,244	108	118,988
Feb.	86	76,034	128	214,363	12	11,014
Mar.	30	22,838	192	224,934	33	65,143

Source: U. S. Department of Commerce.

Rubber

natural

synthetic

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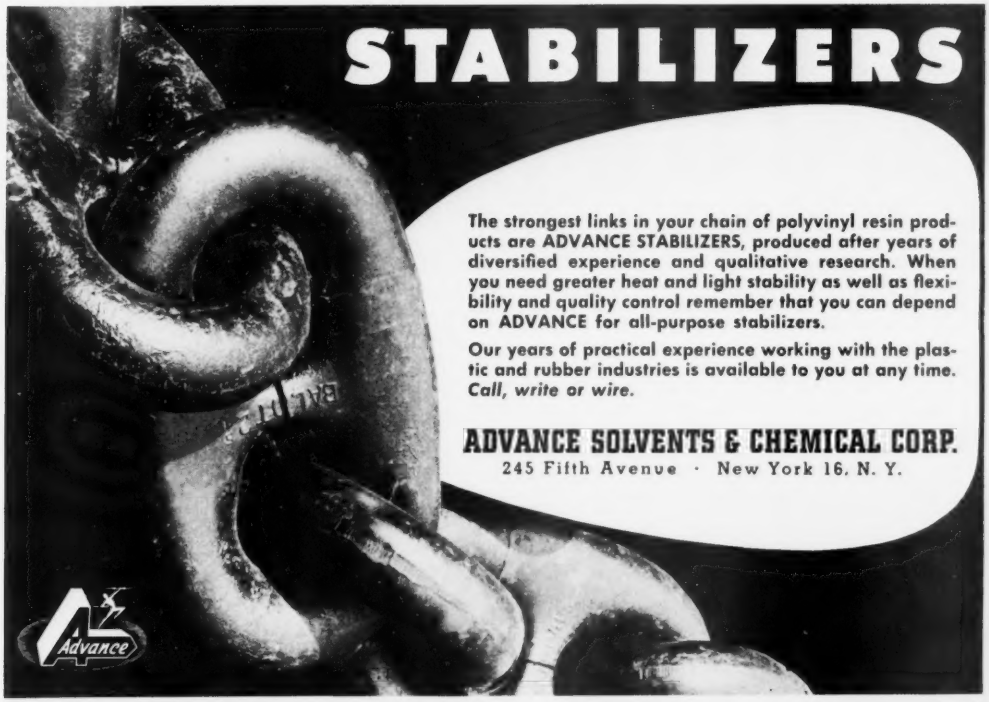

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Advance

Synthetic Rubber—Totals

(GR-S, Neoprene, Butyl, and Buna N Types)

(All Quantities in Long Tons)

Year	Production	Imports	Consumption	Exports	Stocks On Hand at End of Period
1941	8,383	.....	6,259	572	1,702
1942	22,434	.....	17,651	1,419	4,612
1943	231,722	.....	170,891	18,148	41,568
1944	762,630	11,043	566,670	104,266	142,927
1945	820,373	10,407	693,580	83,778	203,454
1946	740,026	7,709	761,699*	72,920	114,963
1947	508,702	1,093	559,366	11,385	62,366
1948	488,343	15,671	442,072	4,874	115,111
1949	393,690	17,242	390,855	6,483	98,042
1950	476,184	25,722	538,289	7,652	52,758
1950:					
Nov.	48,413	1,971	48,261	578	51,636
Dec.	52,199	1,603	53,364	747	52,758
1951:					
Jan.	60,952	1,509	59,584	570	55,453
Feb.	56,415	1,267	53,308	615	59,035
Mar.	65,286	1,152	65,587	526	60,614
Apr.	66,414	1,142	59,947	571	66,876

Source: Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures shown include the output of both government and privately-owned plants. (3) Figures for 1941 are estimated. * Includes year-end adjustment of 5,384 tons to cover non-reporting companies.

Synthetic Rubber—By Type

(All Quantities in Long Tons)

New Supply

	GR-S (Buna S)	GR-M (Neoprene)	GR-I (Butyl)	Buna N Types	Total
1943	182,259	33,603	1,373	14,487	231,722
1944	679,949	56,660	20,252	16,812	773,673
1945	724,859	45,672	52,378	7,871	830,780
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795
1948	415,492	34,848	56,662	7,012	504,014
1949	310,599	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,915	12,037	501,906

Consumption

1943	131,977	26,205	304	12,405	170,891
1944	495,552	46,243	10,763	14,112	566,670
1945	600,145	42,394	43,012	8,029	693,580
1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	68,838	4,536	559,666
1948	345,313	32,118	58,870	5,771	442,072
1949	299,420	31,753	50,855	8,827	390,855
1948	345,313	32,118	58,870	5,771	430,068
1949	299,420	31,753	50,855	8,827	397,139
1950	416,230	43,781	66,348	11,930	538,289

Exports

1943	14,937	2,540	46	631	18,148
1944	98,380	4,799	530	557	104,266
1945	76,555	5,837	980	406	83,778
1946	68,763	2,642	495	797	72,697
1947	7,951	2,617	62	755	11,385
1948	1,093	2,875	21	885	4,874
1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652

Stocks at End of Period

1943	30,975	6,415	1,033	3,145	41,568
1944	116,130	11,739	9,892	5,166	142,927
1945	170,571	9,703	18,378	4,802	203,454
1946	81,483	10,470	19,478	3,755	115,186
1947	40,606	5,237	13,184	3,339	62,366
1948	96,282	5,072	10,995	2,762	115,111
1949	77,771	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758

Source: Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures for GR-M and Buna N Types include production of privately-owned plants.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1944	1945	1946	1947	1948	1949	1950	1951
Jan.	47,540	52,008	51,746	57,057	61,308	63,125	66,908	80,554
Feb.	47,754	48,856	47,654	50,551	56,482	57,980	63,366	72,717
Mar.	52,263	55,364	56,703	59,947	68,171	73,282	78,739	86,486
Apr.	50,005	58,614	62,115	64,140	72,183	75,318	80,348	87,430
May	54,230	60,748	66,800	70,865	77,186	81,665	89,033	.....
June	54,266	60,580	63,247	71,329	78,044	83,374	90,010	.....
July	55,119	66,170	60,076	73,441	81,428	82,129	91,707	.....
Aug.	55,618	70,058	66,729	72,089	80,351	84,707	94,537	.....
Sept.	56,318	64,529	62,268	71,384	76,159	80,832	86,766	.....
Oct.	53,154	55,708	66,637	73,277	75,164	79,327	89,126	.....
Nov.	54,967	53,543	61,345	64,158	72,560	76,746	82,718	.....
Dec.	52,250	49,743	61,101	67,506	72,162	75,628	80,994	.....
Total	633,482	696,333	735,417	795,015	871,270	913,713	994,412	.....

Source: U. S. Bureau of Mines.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude [a]	Exports	Stocks On Hand at End of Period
1936	150,571	141,486	24.6	7,085	19,000
1937	185,033	162,000	29.8	13,233	28,800
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007[b]	254,820	64.6	30,405	42,532
1943	304,058[c]	291,082	59.6	15,678	46,201
1944	260,631[d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,263
1950	314,008	303,733	24.1	11,740	35,708
1950:					
July	24,347	23,377	22.2	864	30,371
Aug.	27,640	26,151	22.8	900	31,793
Sept.	29,749	29,250	26.4	1,177	33,395
Oct.	32,710	32,785	26.5	989	33,530
Nov.	30,265	30,260	31.3	1,237	33,960
Dec.	32,632	29,905	30.4	1,241	35,708
1951:					
Jan.	33,044	32,455	31.0	1,336	35,543
Feb.	30,502	28,792	31.7	1,629	36,885
Mar.	35,294	32,678	32.4	1,475	38,334
Apr.	33,180	32,179	32.3	1,552	38,450

Source: 1936-40, Department of Commerce; 1941 to date, Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (a) Includes natural and synthetic rubber. (b) Includes 893 tons of imports. (c) Includes 67 tons of imports. (d) Includes 21 tons of imports.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1931	1,973,090	416,648	2,389,738	1941	3,744,500	875,381	4,619,681
1932	1,135,491	235,187	1,370,678	1942	220,814	133,083	353,897
1933	1,573,512	346,545	1,920,057	1943	0	4,501	4,501
1934	2,177,919	575,192	2,753,111	1944	0	124,819	124,819
1935	3,252,244	694,690	3,946,934	1945	83,792	313,643	397,435
1936	3,669,528	781,862	4,451,390	1946	2,148,699	930,760	3,079,459
1937	3,915,889	892,382	4,808,271	1947	3,558,178	1,220,634	4,778,812
1938	2,000,985	485,852	2,486,837	1948	3,909,270	1,363,856	5,273,126
1939	2,866,796	704,308	3,571,104	1949	5,108,841	1,123,736	6,232,577
1940	3,692,328	721,637	4,413,965	1950	6,665,836	1,332,263	7,998,099
1950:							
Jan.	487,824	93,323	581,147	July	595,067	111,028	706,095
Feb.	385,361	89,971	475,332	Aug.	682,782	134,853	817,635
Mar.	469,618	110,843	580,461	Sept.	616,827	105,562	722,389
Apr.	455,193	103,850	559,043	Oct.	651,169	108,815	723,984
May	575,518	120,963	696,481	Nov.	504,445	98,538	602,983
June	720,688	135,332	856,020	Dec.	521,371	118,890	640,261
1951:							
Jan.	478,589	127,583	606,172	July	.....	.....	.....
Feb.	505,865	111,935	617,800	Aug.	.....	.....	.....
Mar.	617,399	136,794	754,193	Sept.	.....	.....	.....
Apr.	503,038	135,415	638,453	Oct.	.....	.....	.....
May	512,076	140,050	652,126	Nov.	.....	.....	.....
June	.....	.....	.....	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.

Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Rim Production

	1946	1947	1948	1949	1950
Passenger Car	15,058,469	21,346,004	23,842,796	27,715,344	35,096,404
Truck & Bus	5,939,244	7,737,353	6,920,231	4,238,174	6,625,129
Agricultural	1,735,992	2,633,699	3,140,882	2,695,430	2,853,483
Earth Mover	5,520	10,610	13,330	9,895	15,602
Total	22,739,225	31,727,666	33,917,239	34,658,843	44,590,618

	1951					
	Jan.	Feb.	Mar.	Apr.	May	June
Passenger Car	2,741,867	2,667,575	3,400,462	2,930,710	2,645,443	2,131,958
Truck & Bus	620,562	515,761	633,837	658,581	642,612	548,424
Agricultural	306,524	265,807	2,207	283,561	244,342	212,354
Earth Mover	1,731	4,152	3,658	2,073	1,138	1,418
Total	3,670,704	3,453,295	4,348,001	3,874,925	3,533,535	2,914,154

Source: The Tire & Rim Association, Inc.

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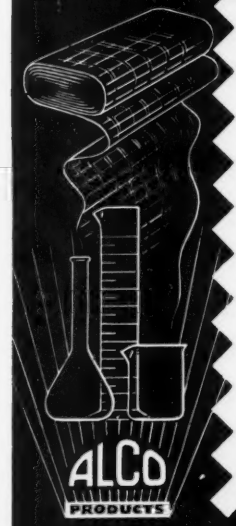

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CHARLOTTE, N.C.

Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1938 (total)	**11,516**	**30,567**	**1,049**	**43,132**	**40,907**	**8,451**
Passenger Car	10,086	27,104	580	37,770	35,789	6,937
Truck and Bus	1,430	3,463	469	5,362	5,118	1,514
1939 (total)	**18,208**	**38,022**	**1,279**	**57,509**	**57,613**	**8,665**
Passenger Car	15,742	33,471	607	49,820	49,933	7,108
Truck and Bus	2,466	4,551	672	7,689	7,680	1,557
1940 (total)	**22,252**	**35,346**	**1,176**	**58,774**	**59,186**	**9,127**
Passenger Car	19,560	30,903	411	50,874	50,965	7,270
Truck and Bus	2,692	4,443	765	7,900	8,221	1,857
1941 (total)	**24,780**	**39,895**	**1,489**	**66,164**	**61,540**	**4,436**
Passenger Car	19,855	34,119	586	54,560	50,392	3,165
Truck and Bus	4,925	5,776	903	11,604	11,148	1,271
1942 (total)	**6,688**	**8,872**	**207**	**15,759**	**15,351**	**6,247**
Passenger Car	910	2,734	38	3,682	2,790	4,432
Truck and Bus	5,770	6,138	169	12,077	12,561	1,815
1943 (total)	**6,128**	**18,547**	**225**	**24,900**	**20,423**	**1,883**
Passenger Car	82	10,606	71	10,759	7,620	1,132
Truck and Bus	6,046	7,941	154	14,141	12,803	751
1944 (total)	**6,654**	**26,439**	**263**	**33,356**	**33,446**	**2,013**
Passenger Car	208	18,330	130	18,668	18,819	1,218
Truck and Bus	6,446	8,109	133	14,688	14,627	795
1945 (total)	**5,984**	**36,479**	**504**	**42,967**	**44,524**	**3,077**
Passenger Car	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	**15,310**	**65,490**	**1,512**	**82,312**	**82,298**	**2,448**
Passenger Car	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	**25,056**	**62,871**	**3,256**	**91,183**	**95,550**	**6,949**
Passenger Car	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	**26,845**	**49,148**	**1,787**	**77,781**	**81,314**	**10,698**
Passenger Car	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	**31,584**	**43,466**	**1,467**	**76,517**	**76,369**	**10,638**
Passenger Car	28,129	36,440	509	65,077	65,140	8,904
Truck and Bus	3,456	7,026	958	11,440	11,228	1,734
1950 (total)	**41,349**	**56,808**	**1,430**	**99,587**	**92,754**	**3,794**
Passenger Car	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951:						
Feb. (total)	3,002	3,058	114	6,174	5,887	3,307
Passenger Car	2,601	2,320	48	4,969	4,698	2,507
Truck and Bus	400	738	66	1,205	1,189	800
Mar. (total)	3,620	3,493	123	7,235	6,693	2,804
Passenger Car	3,125	2,605	54	5,784	5,298	2,055
Truck and Bus	495	888	69	1,451	1,395	749
Apr. (total)	2,801	3,367	88	6,257	6,540	3,047
Passenger Car	2,280	2,560	33	4,873	5,108	2,255
Truck and Bus	521	808	55	1,384	1,432	792

Source: The Rubber Manufacturers Association, Inc.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton				Rayon and Nylon[b]		
	Tire Cord Not Woven	Cord Fabric Woven	Chafer and All Other Tire Fabrics	Total	Tire Cord Not Woven	Tire Cord And Other Tire Fabrics	Total
1947:							
Jan.-Mar.	**21,972**	**49,377**	**21,815**	**93,164**	**5,322**	**52,059**	**57,381**
Apr.-June	**23,491**	**53,746**	**16,480**	**93,717**	**5,486**	**47,360**	**52,846**
July-Sept.	**15,571**	**44,291**	**14,596**	**74,458**	**6,161**	**51,719**	**57,880**
Oct.-Dec.	**18,183**	**48,532**	**17,762**	**84,477**	**6,550**	**55,078**	**61,628**
Total	79,217	195,946	70,653	345,816	23,519	206,216	229,735
1948:							
Jan.-Mar.	**18,546**	**50,251**	**19,391**	**88,188**	***a***	**60,569**	**60,569**
Apr.-June	**15,585**	**45,385**	**18,213**	**79,183**	***a***	**59,759**	**59,759**
July-Sept.	29,743	45,927	*c*	75,670	*a*	63,642	63,642
Oct.-Dec.	13,321	34,424	15,879	63,624	*a*	65,258	65,258
Total	77,195	175,987	53,483	306,665	.....	249,228	249,228
1949:							
Jan.-Mar.	*d*	33,213	25,395	56,608	*a*	68,296	68,926
Apr.-June	5,309	29,114	13,617	48 040	*a*	68,269	68,269
July-Sept.	1,343	16,620	11,141	29,104	15,640	55,969	71,609
Oct.-Dec.	180	17,650	11,886	29,716	12,967	58,890	72,857
Total	6,832	96,597	62,039	163,468	28,607	251,424	281,661
1950:							
Jan.-Mar.	3,939	19,210	12,948	36,097	12,469	60,981	73,450
Apr.-June	11,077	29,498	14,071	54,646	11,510	59,966	71,476
July-Sept.	10,529	39,792	15,101	65,152	13,161	61,614	74,775
Oct.-Dec.	13,314	37,759	14,405	65,578	12,942	63,399	76,341
Total	38,859	126,259	56,525	221,473	50,082	245,960	296,476

Source: U. S. Bureau of the Census.

Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics. (c) Included with tire cord not woven. (d) Included with chafer and all other tire fabrics.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1938	11,515	28,134	644	40,293	37,848	8,166
1939	18,190	31,998	1,002	51,190	50,649	7,036
1940	22,172	29,070	972	52,214	52,237	7,017
1941	24,722	33,749	1,232	59,703	57,433	4,686
1942	6,895	7,213	159	14,267	12,685	6,206
1943	6,350	12,474	189	19,014	15,014	2,626
1944	6,460	20,569	196	27,224	27,488	2,413
1945	5,988	33,906	411	40,304	41,742	3,627
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1948	26,833	40,548	1,119	68,499	70,033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41,240	42,671	811	84,723	80,179	.....
1951:						
Jan.	3,039	3,487	69	6,595	5,950	5,852
Feb.	3,000	2,842	68	5,910	5,144	5,154
Mar.	3,624	2,896	73	6,593	5,828	4,595
Apr.	2,758	2,788	48	5,593	5,566	4,657

Source: The Rubber Manufacturers Association, Inc.

Smoked Sheets–Spot Closing Prices

(New York Market—Cents per pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1910	288	141	206.60	1931	8⅝	4¼	6.17
1911	184	114	141.30	1932	4¾	2½	3.49
1912	140	108	121.60	1933	9⅞	2⅝	5.96
1913	113	59	82.04	1934	15⅝	8¾	12.92
1914	93	56	65.33	1935	13¾	10½	12.37
1915	79	58½	65.85	1936	23	13½	16.41
1916	102	55	72.50	1937	26⅛	14	19.39
1917	90	52	72.23	1938	17⅞	10¼	14.64
1918	70	40	60.15	1939	24	14⅜	17.57
1919	57	38½	48.70	1940	24	18¼	20.10
1920	56½	16	36.30	1941	24½	19½	22.40
1921	21¼	11½	16.36	1942	22½	22½	22.50
1922	28⅜	13⅜	17.50	1943	22½	22½	22.50
1923	37½	24¾	29.45	1944	22½	22½	22.50
1924	40⅜	17⅜	26.20	1945	22½	22½	22.50
1925	121	34⅜	72.46	1946	22⅜	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¼	17	22.48	1949	19¾	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16½	7½	11.98				

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1944	1945	1946	1947	1948	1949	1950	1951
Jan.	20.76	22.36	25.49	32.58	36.09	33.37	31.89	45.04
Feb.	21.34	22.29	26.57	33.91	33.63	33.43	32.79	(a)
Mar.	21.65	22.43	27.52	35.89	35.04	33.44	32.65	46.06
Apr.	21.71	21.88	28.40	35.89	38.10	33.84	33.23	46.06
May	21.63	23.30	28.17	36.51	38.57	33.73	33.64	46.06
June	23.31	23.42	29.89	37.83	38.12	33.56	34.61	46.06
July	22.33	23.27	34.11	38.03	34.89	32.99	38.11	..
Aug.	22.11	23.10	36.31	34.83	32.23	32.06	38.93	.....
Sept.	22.10	23.25	37.59	32.21	31.92	30.94	41.62	.....
Oct.	22.32	23.85	36.79	32.39	32.01	30.32	40.66	.....
Nov.	22.13	24.71	31.50	34.50	32.15	30.52	43.11	.....
Dec.	22.28	25.21	33.03	36.74	32.90	31.08	43.37	.....
Average for Year	21.89	23.25	31.28	35.11	34.64	32.44	37.05	.....

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Consumption of Vinyl Resins

(In Thousands of Pounds)

	Sheeting and Film [a]	Textile and Paper Coating Resins [b]	Molding and Extrusion Materials [a]	All Other [b, c]
1946	52,080	11,673	61,852	27,082
1947	66,430	17,237	73,914	27,064
1948	**98,021**	**31,085**	**73,598**	**21,147**
1949	157,344	29,470	81,842	19,792
1950	227,149	46,044	113,889	21,868
1951:				
Jan.	15,552	3,788	11,133	1,263
Feb.	12,978	3,260	9,916	1,247
Mar.	15,359	3,959	11,553	1,719
Apr.	13,943	3,757	12,174	1,780

Source: Bureau of the Census.

Notes: (a) Includes weight of fillers, plasticizers, extenders and safety glass sheeting; (b) Resin content; (c) Includes Adhesives, but excludes data for protective coating resins.

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BROOKLYN COLOR WORKS INC.,
MORGAN & NORMAN AVES., BROOKLYN 22, N.Y.

Rubber Industry Employment, Wages and Hours

All Rubber Products

	1950				1951			
Mo.	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings	Production Workers (thousands)	Average Weekly Earnings	Average Weekly Hours	Average Hourly Earnings
Jan.	187	$60.52	39.4	$1.536	222	66.78	40.4	1.653
Feb.	188	59.90	39.2	1.528	223	62.93	38.7	1.626
Mar.	189	59.70	39.3	1.519	220	65.52	39.9	1.642
Apr.	191	61.76	40.0	1.544	218	....	....	....
May	194	64.52	41.2	1.566	...	....	....	....
June	199	65.08	41.4	1.572	...	....	....	....
July	200	65.59	41.2	1.592	...	....	....	....
Aug.	208	66.25	41.8	1.585	...	....	....	....
Sept.	215	66.58	41.9	1.589	...	....	....	....
Oct.	219	66.29	41.9	1.582	...	....	....	....
Nov.	222	66.52	41.5	1.603	...	....	....	....
Dec.	222	68.76	41.6	1.653	...	....	....	....

Tires and Tubes

Jan.	82.6	67.70	38.4	1.763	91.3	73.69	38.4	1.919
Feb.	83.1	67.22	38.3	1.755	90.6	66.88	35.5	1.884
Mar.	83.4	65.26	37.4	1.745	88.3	70.91	37.4	1.896
Apr.	84.0	69.23	39.0	1.775	...	....	....	....
May	85.9	74.60	41.1	1.815	...	....	....	....
June	88.0	74.05	40.6	1.824	...	....	....	....
July	88.3	75.22	40.4	1.862	...	....	....	....
Aug.	89.6	76.01	40.8	1.863	...	....	....	....
Sept.	91.7	75.46	40.9	1.845	...	....	....	....
Oct.	92.0	73.12	40.2	1.819	...	....	....	....
Nov.	93.4	73.70	40.1	1.838	...	....	....	....
Dec.	92.1	76.21	39.9	1.910	...	....	....	....

Rubber Footwear

Jan.	20.1	45.87	35.7	1.285	24.9	57.53	41.6	1.383
Feb.	18.8	43.06	34.2	1.259	25.3	55.67	40.4	1.378
Mar.	19.4	51.04	40.0	1.276	25.0	58.17	41.4	1.405
Apr.	19.3	50.36	39.5	1.275	...	....	....	....
May	19.1	50.20	39.4	1.274	...	....	....	....
June	19.3	52.07	40.3	1.292	...	....	....	....
July	19.2	52.13	39.7	1.313	...	....	....	....
Aug.	20.7	53.93	41.9	1.287	...	....	....	....
Sept.	21.8	53.95	41.5	1.300	...	....	....	....
Oct.	22.8	56.00	42.2	1.327	...	....	....	....
Nov.	23.2	54.52	42.0	1.298	...	....	....	....
Dec.	23.9	59.34	42.6	1.393	...	....	....	....

All Other Rubber Products

Jan.	84.5	57.04	41.3	1.381	105.8	63.06	41.9	1.505
Feb.	86.3	56.43	41.1	1.373	106.7	61.44	41.1	1.495
Mar.	86.2	56.16	40.9	1.373	106.9	62.93	41.7	1.509
Apr.	87.2	57.13	41.1	1.390	...	....	....	....
May	88.8	57.92	41.7	1.389	...	....	....	....
June	92.0	59.23	42.4	1.397	...	....	....	....
July	92.8	59.08	42.2	1.400	...	....	....	....
Aug.	98.0	60.13	42.8	1.405	...	....	....	....
Sept.	101.0	61.30	42.9	1.429	...	....	....	....
Oct.	104.1	62.48	43.3	1.443	...	....	....	....
Nov.	105.0	62.71	42.6	1.472	...	....	....	....
Dec.	105.7	64.29	42.8	1.502	...	....	....	....

Source: U. S. Department of Commerce and Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who worked during or received pay for the pay period ending nearest the 15th of the month. The employment series have been adjusted to levels indicated by Federal Security Agency data for 1947, and have been carried forward from 1947 bench-mark levels, thereby providing consistent series. Hours and earning data pertain only to production and related workers.

Production Index for the Rubber Industry

Production 1935-1939 = 100

(Based on man-hours)

	1949	1950	1951		1949	1950	1951
Jan.	193	194	244	July	175	222	....
Feb.	188	195	235	Aug.	178	236	....
Mar.	182	197	239	Sept.	174	244	....
Apr.	177	203	236	Oct.	192	250	....
May	178	213	....	Nov.	187	250	....
June	178	221	....	Dec.	193	251	....

Source: U. S. Department of Commerce.

Sales by the Rubber Industry

(In Millions of Dollars)

	1949	1950	1951		1949	1950	1951
Jan.	260	265	454	July	271	454	....
Feb.	251	273	434	Aug.	288	457	....
Mar.	260	293	462	Sept.	272	404	....
Apr.	257	288	....	Oct.	255	405	....
May	248	321	....	Nov.	247	397	....
June	266	350	....	Dec.	245	424	....

Source: U. S. Department of Commerce.

Rubber Manufacturers' Inventories

(Based upon Book-Value)

(In Millions of Dollars)

	1949	1950	1951		1949	1950	1951
Jan.	661	524	564	July	625	501	....
Feb.	661	526	557	Aug.	563	483	....
Mar.	653	532	556	Sept.	538	502	....
Apr.	648	536	....	Oct.	517	524	....
May	650	540	....	Nov.	526	564	....
June	644	544	....	Dec.	531	549	....

Source: U. S. Department of Commerce.

Various Compounding Materials Consumed by the Rubber Industry

Material	1944	1945	1946	1947	1948	1949	1950
Antimony, Primary:							
Short tons	.....	.....	.....	39	41	55	.....
% of total	.....	.....	.....	.002	.003	.005	.....
Asphalt [a]							
Short tons	20,189	19,483	28,715	32,113	19,967	18,050	.....
% of total	.006	.005	.007	.007	.004	.003	.....
Barite (Barytes):							
Short tons	10,000	10,000	20,000	17,000	18,000	14,000	.....
% of total	2.9	2.1	4.4	3.1	2.85	2.53	.....
Carbon Black:							
Short tons	369,015	402,193	470,732	471,790	435,282	383,565	515,184
% of total	94.6	95.5	95.3	94.3	95.5	93.3	92.9
Clay, Kaolin:							
Short tons	59,588	109,936	162,393	166,201	176,965	197,341	.....
% of total	6.8	11.7	12.3	11.5	11.3	13.1	.....
Clay, Fire & Stoneware:							
Short tons	7,160	7,800	12,951	17,970	15,480	.....	.....
% of total	0.1	0.1	0.2	0.2	0.2	.....	.....
Lime:							
Short tons	5,634	7,170	3,193	589	1,154	715	.....
% of total	0.09	0.12	0.05	0.01	0.02	.0002	.....
Litharge:							
Short tons	3,023	1,864	2,131	2,205	2,835	.....	.....
% of total	2.2	1.3	1.6	1.3	1.8	.....	.....
Lithopone:							
Short tons	726	977	1,607	3,085	4,192	3,245	.....
% of total	0.5	0.7	1.1	1.9	3.0	4.1	.....
Mica, Ground:							
Short tons	1,137	3,715	4,951	3,900	4,372	3,856	.....
% of total	2.2	7.1	8.0	6.0	7.0	7.0	.....
Sulfur:							
Short tons	63,000	64,960	72,800	72,800	70,560	59,360	.....
% of total	1.9	2.0	2.2	1.8	1.7	1.5	.....
Talc [b]							
Short tons	51,833	63,758*	65,980	71,840	66,226	53,414	.....
% of total	13.0	16.0	14.4	13.9	13.0	.12	.....
Zinc Oxide:							
Short tons	59,518	63,447	83,776	82,248	82,895	.....	.....
% of total	42.3	49.6	53.1	51.2	54.9	.....	.....

Source: U. S. Bureau of Mines.

Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. * Revised.

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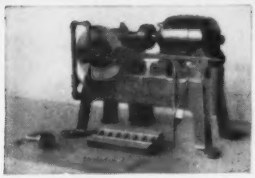

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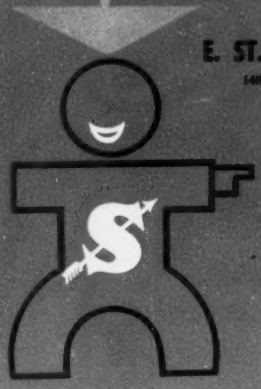

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